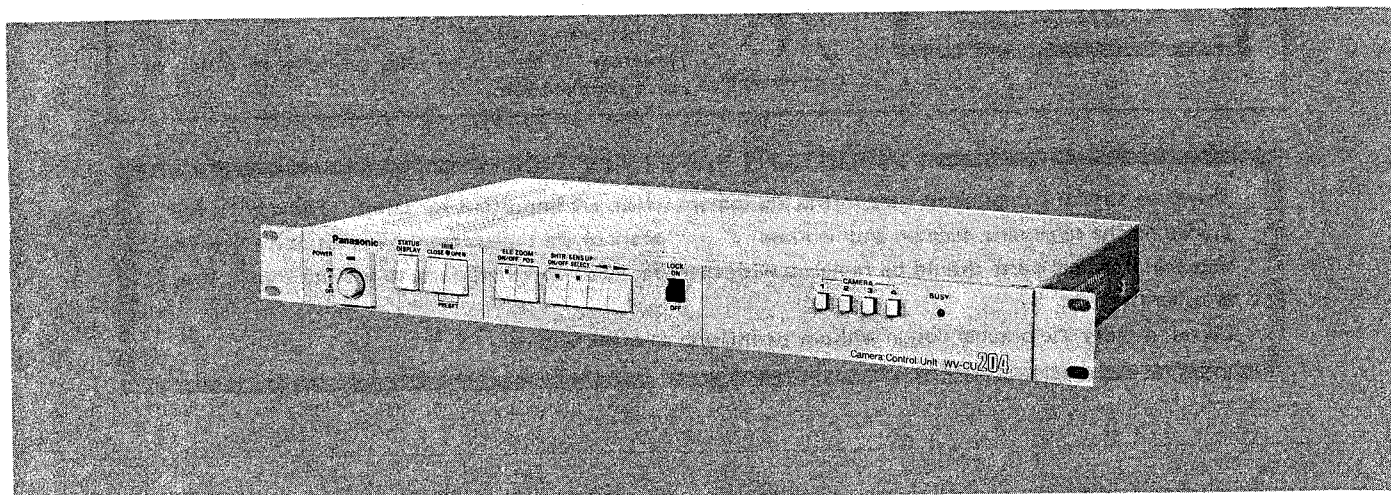


Service Manual

Camera Control Unit WV-CU204

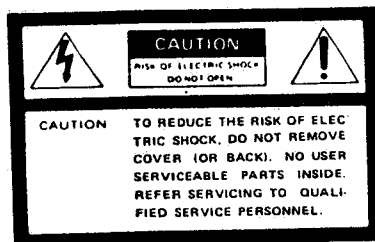


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Panasonic

Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan



This symbol warns the user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this unit.



This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are shaded on the schematic diagram and indicate " ⚠ " mark on the replacement parts list. It is essential that these critical parts should be replaced with manufacture's specified parts to prevent shock, fire, or other hazards.

Do not modify the original design without permission of manufacture.

SPECIFICATIONS

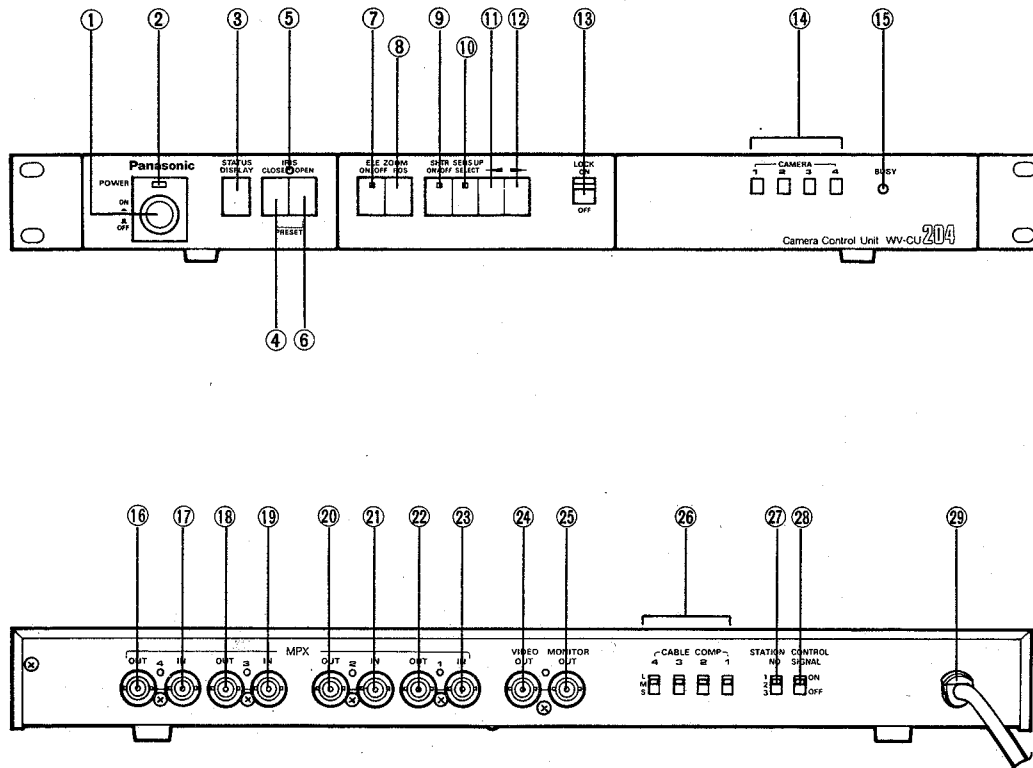
Power Source:	WV-CU204/A and WV-CU204/B: 240V AC, 50 Hz WV-CU204/F and WV-CU204/G: 220V AC, 50 Hz
Power Consumption:	11W
Input Signal:	
Camera Input:	1V p-p / 75 ohms, composite video signal, multiplexed control signal x 4 (BNC Connector)
Output Signals:	
Camera Output:	1V p-p / 75 ohms, composite video signal, multiplexed control signal x 4 (BNC Connector)
Video Output:	1V p-p / 75 ohms, composite video signal x 1 (BNC Connector)
Monitor Output:	1V p-p / 75 ohms, composite video signal, Superimposed Camera Status Display x 1 (BNC Connector)
Control Switches:	Electronic shutter ON/OFF, Electronic Sensitivity Up AUTO/MANUAL/OFF, Shutter speed and sensitivity Increment and Decrement, Electronic Zoom ON/OFF, Electronic Zoom Position Selection, Iris Control Open/Close /Preset, Status Display ON/OFF Switch Lock ON/OFF, Cable - loss Compensation, Control Signal ON/OFF, Station Number Selection.
Ambient Operating Temperature:	-10°C - +50°C
Dimensions:	420 (W) x 44 (H) x 225 (D) mm
Weight:	3 kg

Weight and dimensions indicated are approximate.
Specifications are subject to change without notice.

STANDARD ACCESSORY

Rackmount angle	1 set
Screw for Rackmount angle (M4)	4 pcs.

MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS



1. Power ON/OFF Switch (POWER, ON/OFF)

Used to turning on or off the unit.

When this switch is in the off position, camera video signal(s) connected to the Camera Input Connectors (17), (19), (21) and (23) are bypassed and obtained at the Camera Output Connectors (16), (18), (20) and (22) on the rear panel.

When this switch is depressed, the unit is turned on and the Power Indicator (2) lights. In this case, no character is displayed on the video monitor connected to the Monitor Output Connector (25) on the rear panel.

2. Power Indicator (POWER)

3. Status Display ON/OFF Switch (STATUS DISPLAY)

This is a push-push type switch and is used to turning on or off the character display for the monitor video signal provided at the Monitor Output Connector (25). After turning on the Power ON/OFF Switch, the status display is not observed on the Monitor video output.

This switch is pressed once, the characters for the current camera mode setting of the Electronic Zoom, Electronic Sensitivity Up and electronic Shutter functions are displayed in about 5 seconds. Refer to page 13 for the display contents and pattern.

Notes:

1. When the camera video signal is switched over to the other camera, the current camera mode setting of the selected one is displayed in about 5 seconds.
2. When the Control Mode Selection switch (REMOTE / LOCAL) on the WV-BL600 or WV-CL700 series camera is set to the LOCAL position or the camera other than WV-BL600 or WV-CL700 is connected, the camera status is not displayed.
3. When the Status Display is set to OFF mode, the corresponded switched characters are displayed on the right bottom of the monitor screen for about 5 seconds after switching over the mode or functions.

4. Lens Iris Close Switch (IRIS, CLOSE)

This switch is a push-push type switch and used to close the lens iris of the specified lens such as WV-LA4.5, WV-LA6, WV-LA12, WV-LA18, WV-LA36, WV-LZ81/6, WV-LA6B2 AND WV-LA12B2 etc., mounted on the camera WV-BL600 or WV-CL700 series camera.

Use the Lens Iris Open Switch (6) to open the lens iris of the specified lens.

When the control value is the standard condition, i.e, same as the preset condition, the Iris Indicator LED (5) lights.

To set the lens iris to the standard preset condition, press both the Lens Iris Close Switch (4) and Lens Iris Open Switch (6) at the same time for about 2 seconds and the lens iris of the specified lens on the selected camera is then set to the factory preset position.

Note:

1. This switch is invalidated when the lens other than specified one is used or the Lens Selection switch (DC/VIDEO) on the camera is set to the VIDEO position.
2. The actual iris control is performed by lagging the press of the Lens Iris Open or Close Switches (4), (6) due to time for communication between the camera and the camera control unit.

5. Iris Indicator (IRIS)

This indicator lights when the iris control value is the preset condition or equivalent as the center detent marker.

6. Lens Iris Open Switch (IRIS, OPEN)

This switch is a push-push type switch and used to open the lens iris of the specified lens such as WV-LA4.5, WV-LA6, WV-LA12, WV-LA18, WV-LA36, WV-LZ81/6, WV-LA6B2 AND WV-LA12B2 etc., mounted on the camera WV-BL600 or WV-CL700 series camera.

Use the Lens Iris Close Switch (4) to close the lens iris of the specified lens.

To set the lens iris to the standard preset condition, press both the Lens Iris Close Switch (4) and Lens Iris Open Switch (6) at the same time for about 2 seconds and the lens iris of the specified lens on the selected camera is then set to the factory preset position.

When the control value is the standard condition, i.e, same as the preset condition, the Iris Indicator LED (5) lights.

Note:

1. This switch is invalidated when the lens other than specified one is used or the Lens Selection switch (DC/VIDEO) on the camera is set to the VIDEO position.
2. The actual iris control is performed by lagging the press of the Lens Iris Open or Close Switches (4), (6) due to time for communication between the camera and the camera control unit.

7. Electronic Zoom ON/OFF Switch (ELE ZOOM, ON/OFF)

This is a push-push type switch with LED indicator and used to validate or invalidate the electronic 2-times zoom function.

When this switch is pressed prior to operation of the Zoom position Selection switch (8), the zooming area set by the camera (Center area) or set previously and stored in the memory is zoomed in and the LED indicator of this switch lights.

When this switch is pressed again, the electronic zoom is disabled, the LED indicator of this switch goes off and normal picture is obtained.

The current zooming area is stored in the memory of the selected camera.

To confirm the zooming area prior to the zoom in operation, press the Zoom Position Selection Switch (8) and the selected area of the picture is emphasized in white on the video monitor connected to the Monitor Output Connector (25) and the Video Output Connector (24) and the LED indicator of this switch blinks.

8. Zoom Position Selection Switch (ELE ZOOM, POS)

This is a push-push type switch and used to select the zooming area of the electronic zoom function.

When this switch is pressed under the normal picture condition (Zoom out condition), the selected area to be zoomed in is emphasized in white and the LED indicator of the Electronic Zoom ON/OFF Switch (7) is blinking.

The selected area is switched over as following order. (Center → Left Top → Right Top → Left Bottom → Right Bottom → Center).

When this switch is pressed under zoomed in condition, the actual zooming area is switched over in the same order as above.

Note:

Zooming size can not be changed and fixed as 2-times.

9. Electronic Shutter ON/OFF Switch (SHTR, ON/OFF)

This is a push-push type switch with LED indicator and used to validate or invalidate the electronic shutter function.

When this switch is pressed prior to operation of the Decrement switch (11) or Increment Switch (12), the selected camera is set to the electronic shutter mode with the shutter speed set by the camera (1/250, 1/500, 1/1,000) or set previously and stored in the memory and the LED indicator of this switch lights.

When the Status Display is set to OFF mode, the current shutter speed is displayed in the right bottom on the Monitor Output Video Monitor for about 5 seconds.

To change the shutter speed, press the Decrement Switch (11) or Increment switch (12).

When this switch is pressed again, the electronic shutter is disabled, the LED indicator of this switch goes off and normal picture is obtained.

The current shutter speed is stored in the memory of the selected camera.

CAUTION:

The electronic shutter can not be used together with the electronic sensitivity up function at the same time.

10. Electronic Sensitivity Up Selection Switch (SENS UP SELECT)

This is a push-push type switch with LED indicator and used to validate or invalidate the electronic sensitivity up function.

By pressing this switch, the mode is switched over as NORMAL (LED: OFF) → AUTO (LED: ON) → MANUAL (LED: blinks) → NORMAL.

When this switch is pressed prior to operation of the Decrement switch (11) or Increment Switch (12), the selected camera is set to the automatic electronic sensitivity up mode with the maximum sensitivity set by the camera (X 10) or set previously and stored in the memory and the LED indicator of this switch lights.

When the Status Display is set to OFF mode, the maximum multiple number of the electronic sensitivity up is displayed in the right bottom on the Monitor Output Video Monitor for about 5 seconds.

To change the maximum multiple number of the automatic electronic sensitivity up mode, press the Decrement Switch (11) or Increment switch (12).

When this switch is pressed again, the selected camera is set to the manual electronic sensitivity up mode with the sensitivity currently set in the automatic electronic sensitivity up mode or the lens iris is fully opened together with the X1 of manual sensitivity up mode and stored in the memory and the LED indicator of this switch blinks.

When the Status Display is set to OFF mode, the current multiple number of the manual electronic sensitivity up mode is displayed in the right bottom on the Monitor Output Video Monitor for about 5 seconds.

To change the multiple number of the manual electronic sensitivity up mode, press the Decrement Switch (11) or Increment switch (12).

When this switch is pressed again (third time), the electronic sensitivity up mode is disabled, the LED indicator of this switch goes off and normal picture is obtained.

The current maximum multiple number is stored in the memory of the selected camera.

CAUTION:

The electronic sensitivity up function can not be used together with the electronic shutter function at the same time.

11. Decrement Switch (◀)

This is a push-push type switch and used to decrease the electronic shutter speed or multiple number of the electronic sensitivity up mode.

12. Increment Switch (▶)

This is a push-push type switch and used to increase the electronic shutter speed or multiple number of the electronic sensitivity up mode.

13. Lock ON/OFF Switch (LOCK, ON/OFF)

This switch is used to freeze the current status of the electronic zoom, electronic shutter and electronic sensitivity up modes and to invalidate the these keys operation on your control unit.

Note:

1. Even if this switch is set to ON position, the switch operation of the other control unit(s) is valid.

14. Camera Selection Switches (CAMERA, 1/2/3/4)

This switch is a latch selective type (For example, the one whose number 2 is turned off at the same time as number 3 is on with number 2 previously being set to on position.) and used to select the camera to be set the mode and the video signal provided to the Video Output Connector (24) and Monitor Output Connector (25).

Note:

1. Since the switching timing of these switches is not synchronized with the vertical sync of the video signals from the 4 cameras, the picture on the video monitor connected to the Video Output Connector (24) or Monitor Output Connector (25) may be disturbed or rolled vertically at the time of switching.

15. Busy Indicator (BUSY)

This LED indicator lights about 2 to 7 seconds when the control unit(s) other than yours is(are) is used to set the corresponded camera modes.

When this indicator lights, your switch operation is invalidated and wait for a while until the indicator goes off.

16. MPX-4 Output Connector (MPX, 4, OUT)

The composite video signal connected to the MPX-4 Input Connector (17) is provided at this connector to be supplied to the other Camera Control unit or video monitor.

When the 4 (camera-4) of the Camera Selection Switches (14) is not pressed, or the Power ON/OFF Switch (1) is in the OFF position, the composite video signal fed to MPX-4 Input Connector (17) is bypassed and obtained at this connector.

When the 4 (camera-4) of the Camera Selection Switches (14) is pressed with setting the Control Signal ON/OFF Switch (28) to the ON position, the multiplexed control signal and the composite video signal fed to MPX-4 Input Connector (17) is provided at this connector.

17. MPX-4 Input Connector (MPX, 4, IN)

This connector accepts the colour or B/W composite video signal of the camera. (WV-BL600 or WV-CL700 series)

CAUTION:

1. The input video signal should be specified as CCIR standard.

18. MPX-3 Output Connector (MPX, 3, OUT)

The composite video signal connected to the MPX-3 Input Connector (19) is provided at this connector to be supplied to the other Camera Control unit or video monitor.

When the 3 (camera-3) of the Camera Selection Switches (14) is not pressed, or the Power ON/OFF Switch (1) is in the OFF position, the composite video signal fed to MPX-3 Input Connector (19) is bypassed and obtained at this connector.

When the 3 (camera-3) of the Camera Selection Switches (14) is pressed with setting the Control Signal ON/OFF Switch (28) to the ON position, the multiplexed control signal and the composite video signal fed to MPX-3 Input Connector (19) is provided at this connector.

19. MPX-3 Input Connector (MPX, 3, IN)

This connector accepts the colour or B/W composite video signal of the camera. (WV-BL600 or WV-CL700 series)

CAUTION:

1. The input video signal should be specified as CCIR standard.

20. MPX-2 Output Connector (MPX, 2, OUT)

The composite video signal connected to the MPX-2 Input Connector (21) is provided at this connector to be supplied to the other Camera Control unit or video monitor.

When the 2 (camera-2) of the Camera Selection Switches (14) is not pressed, or the Power ON/OFF Switch (1) is in the OFF position, the composite video signal fed to MPX-2 Input Connector (21) is bypassed and obtained at this connector.

When the 2 (camera-2) of the Camera Selection Switches (14) is pressed with setting the Control Signal ON/OFF Switch (28) to the ON position, the multiplexed control signal and the composite video signal fed to MPX-2 Input Connector (21) is provided at this connector.

21. MPX-2 Input Connector (MPX, 2, IN)

This connector accepts the colour or B/W composite video signal of the camera. (WV-BL600 or WV-CL700 series)

CAUTION:

1. The input video signal should be specified as CCIR standard.

22. MPX-1 Output Connector (MPX, 1, OUT)

The composite video signal connected to the MPX-1 Input Connector (23) is provided at this connector to be supplied to the other Camera Control unit or video monitor.

When the 1 (camera-1) of the Camera Selection Switches (14) is not pressed, or the Power ON/OFF Switch (1) is in the OFF position, the composite video signal fed to MPX-1 Input Connector (23) is bypassed and obtained at this connector.

When the 1 (camera-1) of the Camera Selection Switches (14) is pressed with setting the Control Signal ON/OFF Switch (28) to the ON position, the multiplexed control signal and the composite video signal fed to MPX-1 Input Connector (23) is provided at this connector.

NOTE: MPX stands for a Multiplexed camera signal.

23. MPX-1 Input Connector (MPX, 1, IN)

This connector accepts the colour or B/W composite video signal of the camera. (WV-BL600 or WV-CL700 series)

CAUTION:

1. The input video signal should be specified as CCIR standard.

24. Video Output Connector (VIDEO OUT)

The composite video signal selected by the Camera Selection Switches (14) is provided at this connector.

Note:

1. The camera control signal multiplexed on the video signal has been erased at this connector.

25. Monitor Output Connector (MONITOR OUT)

The composite video signal selected by the Camera Selection Switches (14) is provided at this connector and when the Status Display ON/OFF Switch (3) is on, the selected camera status is displayed by superimposed characters.

26. Cable-loss Compensation Switches (CABLE COMP, 1/2/3/4, L/M/S)

These switches are used to set the most suitable position of the cable-loss compensator for each camera input signal. The video output signals at the Video Output Connector (24) and Monitor Output Connector (25) are compensated beside that of the Camera Output Connectors (16), (18), (20), and (22) is not compensated at all.

The suitable switch position and its approximate cable length are as follows.

S: up to 400 m

M: 400 m to 700 m

L: 700 m to 900 m

(with RG-59U (BELDEN 9259 or equivalent))

CAUTION:

Refer to page 9 for system connection and its maximum cable length.

IMPORTANT

When this switch is set improperly, the camera may not be controlled properly. In this case, set this switch to M or L position.

27. Station Number Selection Switch (STATION No.)

This switch is used to set the identification of the control unit.

Set this to No.1 position for the nearest control unit to the connected cameras.

Set this to No. 2 position for the control unit next to the one which station number is 1.

Set this to No. 3 position for the control unit for the furthest control unit from the connected cameras.

28. Control Signal ON/OFF Switch (CONTROL SIGNAL, ON/OFF)

This switch is used to select the control signal multiplexed on the video signal provided at the Camera Output Connectors (16), (18), (20), and (22) to be mixed or not.

When one piece of the Camera Control Unit is used, set this switch to OFF position to delete the multiplexed control signal obtained at the Camera Output Connectors.

When two or three Camera Control Units are used, set this switch on the furthest unit from the cameras to OFF position while the one on the other(s) is(are) set to ON position so that the control signal of the first control unit or that of the second one to be sent to the last one.

29. Power Cord

CIRCUIT DESCRIPTION

1. Principle of Camera Control Unit

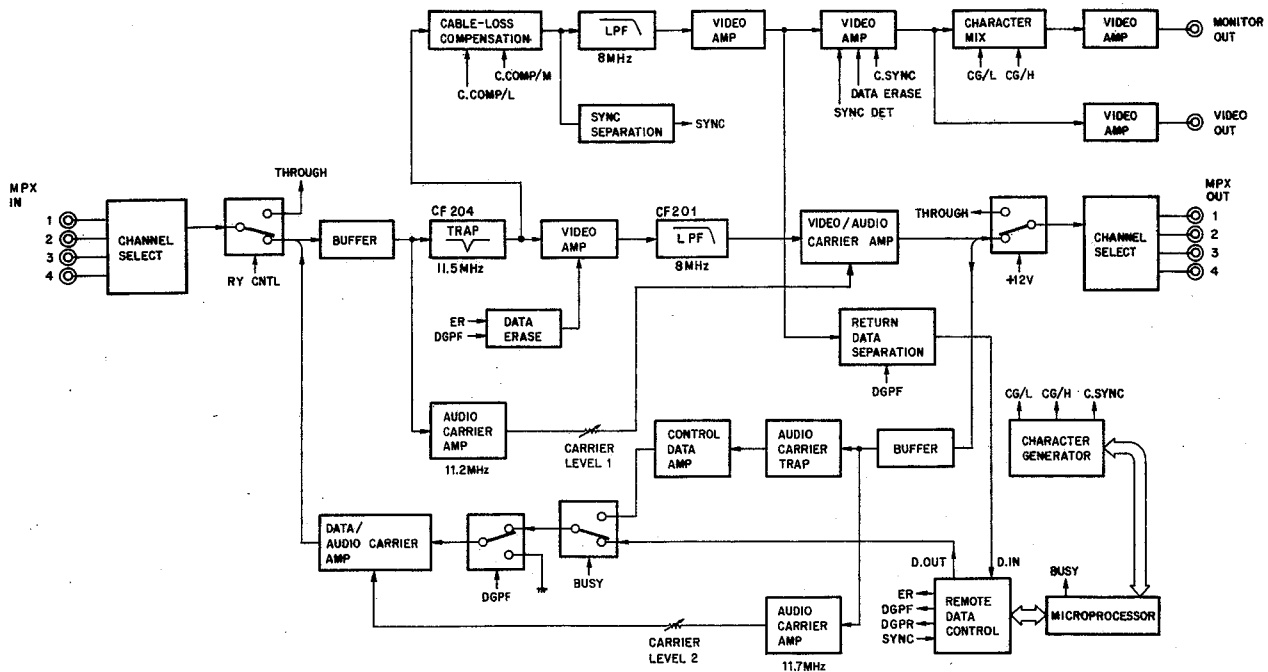


Fig. 1-1 Block Diagram of WV-CU204

This Camera Control Unit WV-CU204 allows you to remotely control the various camera function of WV-BL600 series and WV-BL700 series cameras by sending the multiplexed control signal using single coaxial cable for composite video signal. The composite video signal multiplexed control signal for the camera is received this CCU (Camera Control Unit) through camera In connector on the rear of CCU. This signal is supplied to video amplifier circuit, return data control circuit and video monitor circuit on the Interface Board respectively.

- Video Monitor Circuit

The composite video signal obtained Monitor Output Connector is mixed the camera status character display on the video monitor by video monitor circuit. The control signal for the camera and sync signal on the composite video signal are separated from the composite video signal by video monitor circuit. The composite video signal erased control data and not mixed the camera status character display is obtained the Video Output Connector. So this connector obtains the composite video signal only.

- Video Amplifier Circuit
- Return Data Control Circuit
- Audio Carrier Amplifier Circuit

The MPX Output Connector obtains the composite video signal multiplexed control signal and 11.2MHz carrier for intercom system through the MPX Input Connector and the Interface Board. Then the multiplexed control signal can be erased on the composite video signal by Control Signal ON/OFF Switch of WV-CU204.

When the system is using multiple camera control units, the control data and 11.7MHz carrier for intercom are obtained MPX Output Connector from the second or third station.

The signals multiplexed on the composite video signal are sent to the camera through data control circuit and audio carrier amplifier on the Interface Board and MPX Input Connector.

The carrier of 11.2MHz and 11.7MHz multiplexed on the coaxial cable is used intercom system that is provided for the camera control unit WV-CU254.

2. Interface Board

The Interface Board contains following circuits

- 2-1. Video Monitor Circuit
- 2-2. Video Amplifier Circuit
- 2-3. Data Control circuit
- 2-4. Audio Carrier Amplifier Circuit
- 2-5. Regulator Circuit

2-1. Video Monitor Circuit

This circuit receives the composite video signal multiplexed camera control return data from the camera and separates the control data from the composite video signal.

Then the composite video signal is sent the Video Out connector is sent the MPX Output Connector from this circuit respectively.

- Cable-loss Compensation Amplifier

The composite video signal selected by Camera Selection Switches on the Camera Selector Board is obtained base of cable-loss compensation amplifier Q113 through buffer Q112 and video amplifier Q219 on the Interface Board.

This circuit compensates the coaxial cable-loss between the camera and this camera control unit by selecting emitter resistors and capacitors of cable-loss compensation amplifier Q113 and Q114.

A DC voltage selected by Cable-loss Compensation Switches on the Switch Board is fed to base of Cable-loss compensation control Q132 or Q133 through pin 4 or pin 2 of B15 on the Interface Board.

Q132 switches the compensation elements composed R139 - R141, C118 and C119 when the Cable-loss Compensation Switch is set to M position.

Q133 switches the compensation elements composed R142 - R144, C120 - C122 when the Cable-loss Compensation Switch is set to L position.

- Video Amplifier Circuit

The composite video signal is amplified this circuit composed Q115 - Q118, Q123, Q125, Q128 and Q129 with clamp gate Q122.

- Sync Separation Circuit

This circuit composed Q119 - Q121 separates sync signal from composite video signal of the camera connected this camera control unit.

The sync signal separated composite video signal is supplied to pin 55 of remote data control IC2 on the Microprocessor Board.

The character display location of camera status is synchronized with this signal.

If this sync signal is not supplied to remote data control IC2 on the Microprocessor Board, the character display location of camera status is synchronized with internal sync signal oscillator at character generator IC1 on the Microprocessor Board.

- Data Separation Circuit

This circuit composed Q124, Q207 - Q209 and Q210 separates the multiplexed return data from the camera on the composite video signal. And the separated return data is sent to pin 59 of remote data control IC2 on the Microprocessor Board.

The return data gate IC201(b) controlled by DGPR (Digital Gate Pulse for Reverse) signal passes the return data. The DGPR signal obtained pin 10 of IC201 is sent from pin 4 of CN8 on the Microprocessor Board only a period sent the return data from the camera for vertical blanking.

- Character Mix Circuit

This circuit composed Q104 - Q111 mixes the character display signal of camera status on the composite video signal.

The mixed video signal is sent to Monitor Output Connector.

The character signals CG/H and CG/L sent from the character generator IC1 on the Microprocessor Board are fed to base of character mix control Q107 and Q109 respectively.

The signal CG/H is for illuminant of the character and the signal CG/L is for video signal blanking of the character display location on the video monitor.

2-2. Video Amplifier Circuit

- Video Amplifier Circuit

The composite video signal connected MPX Input Connector is selected by Camera Selection Switch and fed to base of buffer Q112 through RY201.

The selected composite video signal is amplified in this circuit composed CF204, Q219 - Q225, Q224, Q215 - Q218 and sent to MPX Output Connector through RY202. When the Power ON/OFF Switch is OFF position, the composite video signal obtained the MPX Input Connector is passed to the MPX Output Connector through the Camera Selector Board and RY201, RY202 on the Interface Board. This signal obtained MPX Output Connector is supplied to the other Camera Control Unit or video monitor. The low pass filter CF201 cut the carrier multiplexed on the composite video signal for intercom system using WV-CU254. The cut off frequency of CF201 is approximate 8MHz because of the carrier frequency is 11.2 MHz or 11.7 MHz.

- **Return Data Control Circuit**

When the Control Signal ON/OFF Switch is OFF position, the multiplexed return data on the composite video signal is erased at data erase control Q227, Q226 and IC202 (c) by the signals ER, R. DATA CNTL and DGPF (Digital Gate Pulse for Forward).

The R. DATA CNTL signal obtained pin 10 of IC202 (c) is sent from the Switch Board by Control signal ON/OFF Switch. When the switch is ON position, the pin 10 of IC202 (c) becomes low level. Then pin 8 of IC 202 (c) the output of AND gate is kept to low level and this signal is sent to data erase control Q227 and Q226. So Q227 and Q226 are kept to off except the DGPF signal sent from the Microprocessor Board is supplied to Q227. The DGPR signal is supplied when the control data sends to the camera from this Camera Control Unit. Then the DGPR signal is synchronized by vertical blanking period.

2-3. Data Control Circuit

When the multiple control units are used in your system and the second or third station send a control data for the camera, the control data is sent to the camera through this circuit composed Q228 - Q236, Q211 - Q214, IC201 (a), IC202 (b), IC201 (c) and Q201 - Q204. But when this camera control unit sends a control data to control the camera, the data select switch IC201 (a) selects the control data obtained pin 13 of IC201 from the Microprocessor Board to control the camera.

The selected control data of this station or the second or third station is supplied to pin 3 of send data gate IC201 (c) through buffer IC202 (b).

The send data gate IC201 (c) passes the control data when DGPF signal is supplied to pin 9 of IC201. And control data/audio carrier amplifier send the control data multiplexed on the vertical blanking period of the composite video signal to the camera.

2-4. Audio Carrier Circuit

When the multiple control units is used, the second or third station provided with intercom system such as WV-CU254 can send or receive the carriers of this intercom system.

This camera control unit WV-CU204 passes these carriers for the intercom system.

The total gain for the carrier between MPX Input Connector and MPX Output Connector or MPX Output Connector and MPX Input Connector is 0 dB.

2-5. Regulator Circuit

This circuit composed D206 - D209, IC203, IC204, Q205 and Q206 supplies the DC voltage +5V, +12V and Vref.

The DC voltage obtained emitter of reference voltage

regulator Q250 is approximate 1.8V is supplied to the each clamp gate to clamp the composite video signal to pedestal level when the sync signal is supplied.

3. Microprocessor Board

This Microprocessor Board generates pulses such as IFCP, ER, DGPF, DGPR, SYNC DET, etc., and signals to drive LED indicators by key matrix data, return data sent from the camera and the other data. And a character generator sends a character data to display the camera status on the video monitor.

This Board contains following circuits and functions.

1. Microprocessor
2. Remote Data Controller
3. Character Generator
4. Signal Control Circuit
5. Reset Control Circuit

3-1. Microprocessor

This microprocessor IC3 (75P116F) controls the signals by key matrix data, return data sent from the camera and the other data.

- **Key Matrix Control Circuit**

The input data selected switches on the Control Board or the Switch Board is received from key matrix return line pin 10 - pin 17 (P60 - P63, P70 - P73) of IC3. The key matrix return line is controlled by key matrix control circuit that is controlled by key scan strobe signals supplied from pin 1, pin 2 and pin 64 (P41, P40, P42) of IC3.

The active state level of the return line and scan line is low.

- **Data Transfer**

The data between the microprocessor IC3 and the remote data controller IC2 is transferred through 8bits data bus line pin 1 - pin 6, pin 63 and pin 64 (P40 - P43, P50 - P53) of IC3 and pin 43 - pin 50 (D7 - D0) of IC2. This bus line is used for transmitting or receiving the remote control data for the camera then the key matrix line D5 - D7 is stop to scan and the data bus line D0 - D7 of IC2 becomes high impedance state.

- **LED Indicator Signals**

The LED indicator signals obtained pin 53 and pin 22 - pin 25 of IC3 are sent to LED driver IC701 on the Control Board through CN9 on the Microprocessor Board.

3-2. Remote Data Controller

This remote data controller IC2 has a function of serial - parallel or parallel - serial conversion mainly to transfer the camera control data between the microprocessor IC3 and the camera.

The camera control data sent from the microprocessor IC3 and obtained pin 50 - pin 43 (D₀ - D₇) is converted parallel to serial. This serial data obtained pin 56 of IC2 is sent to the Interface Board and multiplexed on the composite video signal. Then the camera control data is sent to the camera.

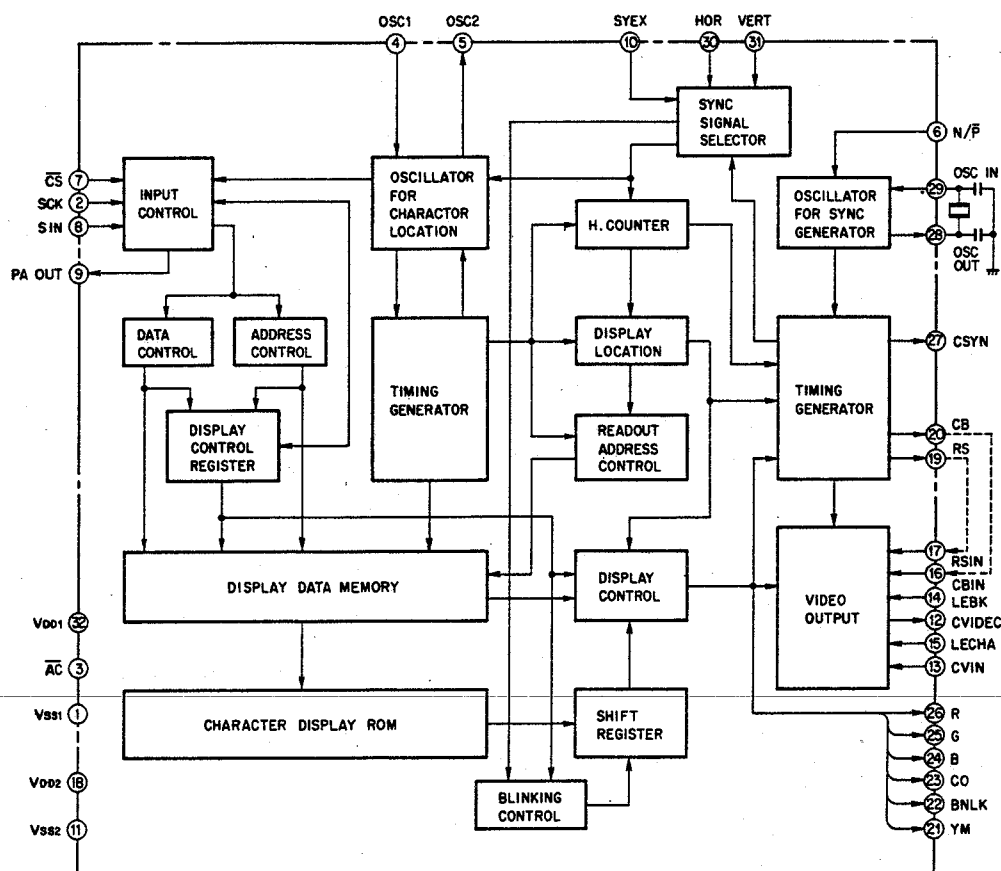
The serial data is received the camera and the camera executes the command sent by the serial data from this camera control unit. Then the data is returned from the camera because of the sent data is right or not in this remote data controller IC2 on the Microprocessor Board. The return data is supplied to pin 59 of IC2.

3-3. Character Generator

This character generator IC1 generates the character display data of the camera status to mix this data on the composite video signal.

The data obtained pin 23 of IC1 is sent to character mix control Q107 on the Interface Board and mixed on the composite video signal. And then the data obtained pin 22 of IC1 is sent to character mix control Q109 on the Interface Board to blank the video signal of the character background.

This character generator IC1 memorized character pattern data in IC1. So IC1 can send the character data to character mix control block when IC1 receives the address data memorized the character pattern and the location data to display the character on the video monitor. These data are supplied to pin 8 of IC1 in serial from pin 20 of microprocessor IC3.



Block Diagram of Character Generator IC 1

The pin identification of character generator IC1 (M50455) is as follows ;

Pin No.	Name	In/Out	Description
1	Vss 1	-	Digital Ground
2	SCK	In	Serial Clock
3	AC	In	Auto Clear
4, 5	OSC1, 2	In	Oscillator For a character location and width on the video monitor.
6	N/P	In	NTSC/PAL Selector (H : NTSC, L : PAL)
7	CS	In	Chip select
8	SIN	In	Serial Data
9	PAOUT	Out	Parity
10	SYEX	In	Sync Signal select (H : External, L : Internal)
11	Vss2		Analog Ground
12	CVIDEO	Out	Not Used
13	CVIN	In	Not Used
14	LEBK	In	Not Used
15	LECHA	In	Not Used
16	CBIN	In	Not Used
17	RSIN	In	Not Used
18	VDD 2	In	Analog +5V
19	RS	Out	Not Used
20	CB	Out	Not Used
21	YM	Out	Not Used
22	BLNK	Out	Character Background Signal
23	CO	Out	Character Signal
24	B	Out	Not Used
25	G	Out	Not Used
26	R	Out	Not Used
27	CSYN	Out	Composite Sync Signal
28	OSCOUT	Out	Sync Signal Oscillator
29	OSCIN	In	Sync Signal Oscillator
30	HOR	In	H. Sync Signal
31	VERT	In	V. Sync Signal
32	Vdd	In	Digital +5V

3-4 Signal Control Circuit

This circuit composed IC8 - IC10 and IC20 - IC23 generates the signals ER, DGPF, DGPR and SYNC DET by processing the signals from microprocessor IC3 and remote data controller IC2.

These signals are supplied to the Interface Board through CN6 or CN8 on the Microprocessor Board.

3-5 Reset Control Circuit

This circuit composed power timing control Q1 and reset control IC7 controls the reset timing of microprocessor IC3 and character generator IC1.

The DC voltage V_{DD} controlled the timing by Q1 is supplied to pin 58 of IC3 and the DC voltage RESET controlled the timing by IC7 is supplied to pin 7 of IC3 and pin 3 of IC1.

4. Connector Board

The MPX Input Connector, the MPX Output Connector, the Video Output Connector and the Monitor Output Connector is installed on this Connector Board.

The MPX Input Connectors are received the composite video signals from the camera.

The MPX Output Connector obtains the composite video signal from the MPX Input Connector through the Camera Selector Board or the Interface Board.

The Video Output Connector and the Monitor Output Connector obtains the composite video signal selected by the Camera Selection Switch. The composite video signal obtained the Monitor Output Connector is mixed the character display data of the camera status.

5. Camera Selector Board

The Camera selection Switches installed on this Camera Selector Board select the composite video signals to process for the Video Output and the Monitor Output or to pass this camera control unit.

And the Camera Selector Board supplies signals C. comp control (1/2/3/4), CH - Change and RY out.

The C. comp control signal supplies the data which camera is selected to the Cable Compensation Switches.

The CH - Change signal is sent to pin 28 of the Microprocessor IC3 on the Microprocessor Board through the Interface Board when the Camera selection Switch is changed.

6. Control Board

This Control Board is installed on the front panel. This board contains the LED indicators, the LED driver IC7 and switches which are composed the key matrix of microprocessor IC3 on the Microprocessor Board to control the microprocessor operation.

7. Switch Board

This Switch Board is installed on the rear panel of this camera control unit.

The Switch Board contains the Cable - loss Compensation Switches, the Station Number Selection Switch and the Control Signal ON/OFF Switch.

The signals selected by the Cable - loss Compensation Switch and the Control Signal ON/OFF Switch is sent to the Interface Board.

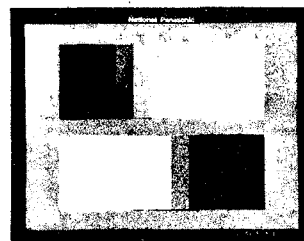
The signal selected by the Station Number Selection Switch is sent to the Microprocessor Board.

ADJUSTMENT PROCEDURE

1. Test Equipment Required

The following test equipment is required for adjusting Camera Control Unit WV-CU204.

- Oscilloscope (Dual trace, More than 20 MHz bandwidth)
- Standard signal generator (For 11.2 MHz and 11.7 MHz)
- Underscand video monitor
- CCTV Camera WV-BL600
- Lens: Automatic iris control lens such as WV-LA12 or Manual iris lens (F1.4 16mm)
- Logarithmic gray scale chart (Part No. YWV2310RB99)



2. Disassembling Procedure for Adjustment

- Remove five screws fixing the upper cover and remove the upper cover. (Fig. 2-1)

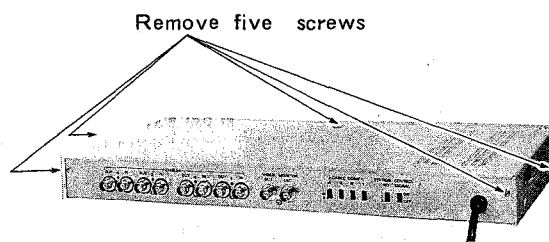


Fig. 2-1

- Remove four screws fixing the front panel and remove the front panel. (Fig. 2-2)

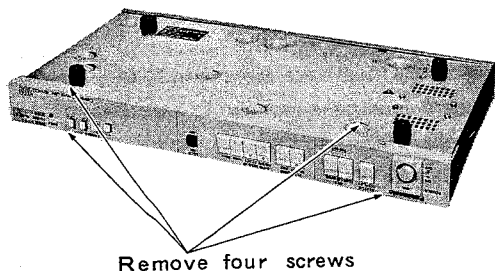


Fig. 2-2

- Push up four locking tabs to remove the Interface Board and the Microprocessor Board. And remove them by pulling them upward. (Fig. 2-3, 2-4)

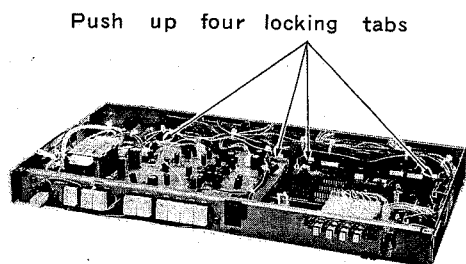


Fig. 2-3

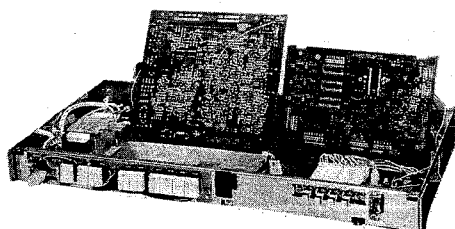


Fig. 2-4

- Remove • point screws to remove the other boards that are the Connector Board, the Camera selector Board, the Switch Board, the Control Board, the Lock Switch Board, the LED Board. (Fig. 2-5, Fig. 2-6)

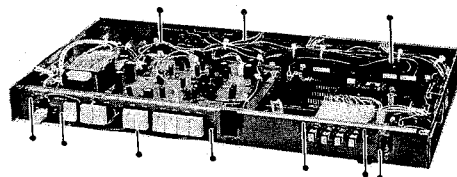


Fig. 2-5

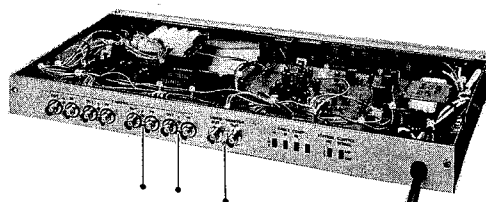


Fig. 2-6

3. Connection and Setting Up for Adjustment

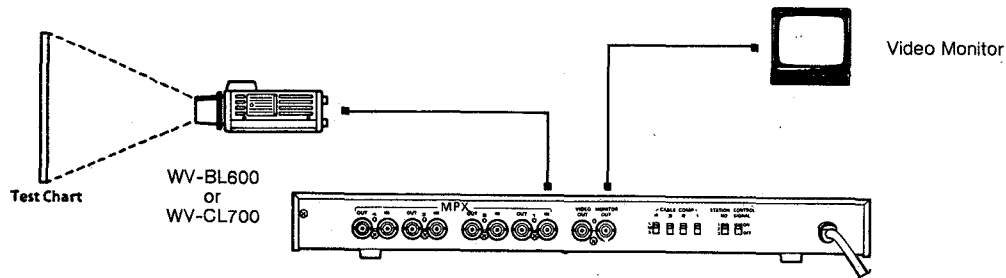


Fig. 3-1

Connection

- Connect the coaxial cable between Monitor Output Connector and underscanned video Monitor,
- Terminate video input of the monitor with 75 ohms.
- Connect the coaxial cable between MPX Input 1 Connector and the camera WV-BL600.
- Set the logarithmic grayscale chart in front of the camera as shown Fig. 3-1.

Set up

- Set respective switches on the Camera Control Unit and the camera as follows.

(Camera Control Unit)

Lock ON/OFF Switch OFF position
 Camera Selection Switch Select Camera 1
 Station Number Selection Switch Select Station 1
 Status Display ON/OFF Switch ON position

(Camera)

Control Mode Selection Switch REMOTE position

- Adjust CV1 (CHAR SIZE) on the Microprocessor Board so that the location of the character (:) on the video monitor becomes $32 \mu\text{sec} \pm 0.5 \mu\text{sec}$ from the sync signal. (Fig 4-1, Fig. 4-2)

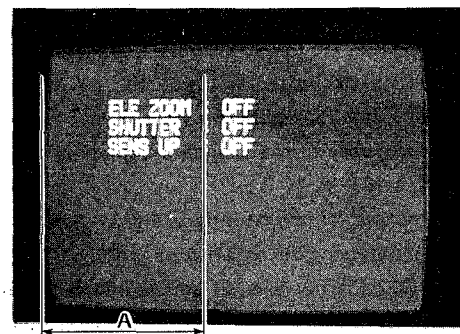
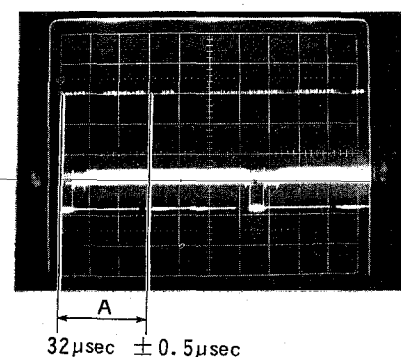


Fig. 4-1



4. Adjustment Procedure

- Refer to the item of the position of adjusting controls.

(1) Character size adjustment

Adjust : CV1 (CHAR SIZE) Microprocessor Board

Observe : Oscilloscope

Video Monitor

- Cap on the lens.
- Connect the oscilloscope to Monitor Output Connector.
- Set the oscilloscope at H rate.

(2) Carrier level 1 adjustment

Adjust: VR201 (Carrier level 1) Interface Board

Observe: Oscilloscope

- Disconnect the coaxial cable of the MPX Input connector 1 for the camera.
- Connect the Standard Signal Generator and the oscilloscope (CH1) to the MPX Input Connector 1.
- Connect the Oscilloscope (CH2) to the MPX Output Connector 1 with 75ohms termination.
- Set the frequency of the standard Signal Generator at $11.2 \text{ MHz} \pm 10 \text{ KHz}$.
- Set the output of the Standard Signal Generator at 300mVp-p observing the oscilloscope CH1.
- Adjust VR201 (Carrier level 1) on the Interface Board so that the MPX Output Connector level becomes 300mVp-p $\pm 5 \text{ mVp-p}$ observing the oscilloscope (CH2).
- Set the frequency of the Standard Signal Generator at $11.7 \text{ MHz} \pm 10 \text{ KHz}$.
- Confirm the MPX Output Connector level is less than 10mVp-p by the oscilloscope (CH2).

(3) Carrier level 2 adjustment

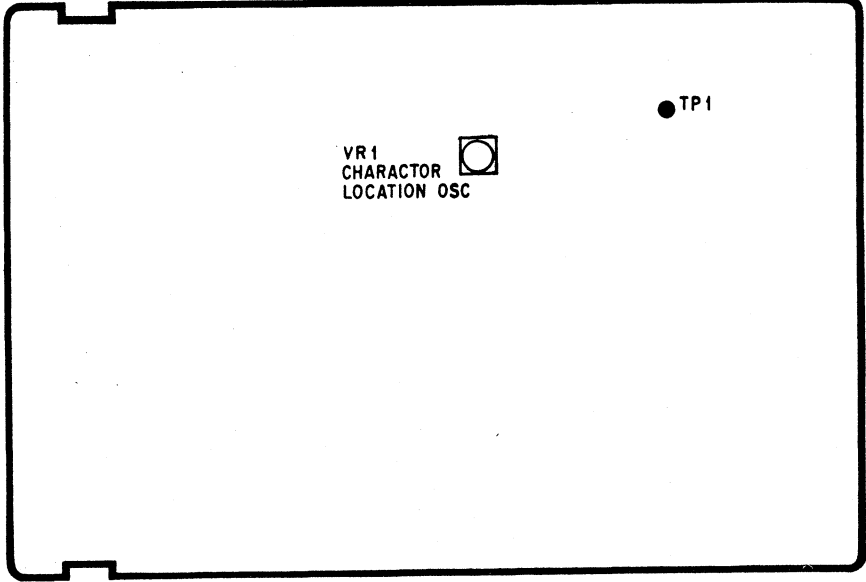
Adjust: VR202 (Carrier level 2) Interface Board

Observe: Oscilloscope

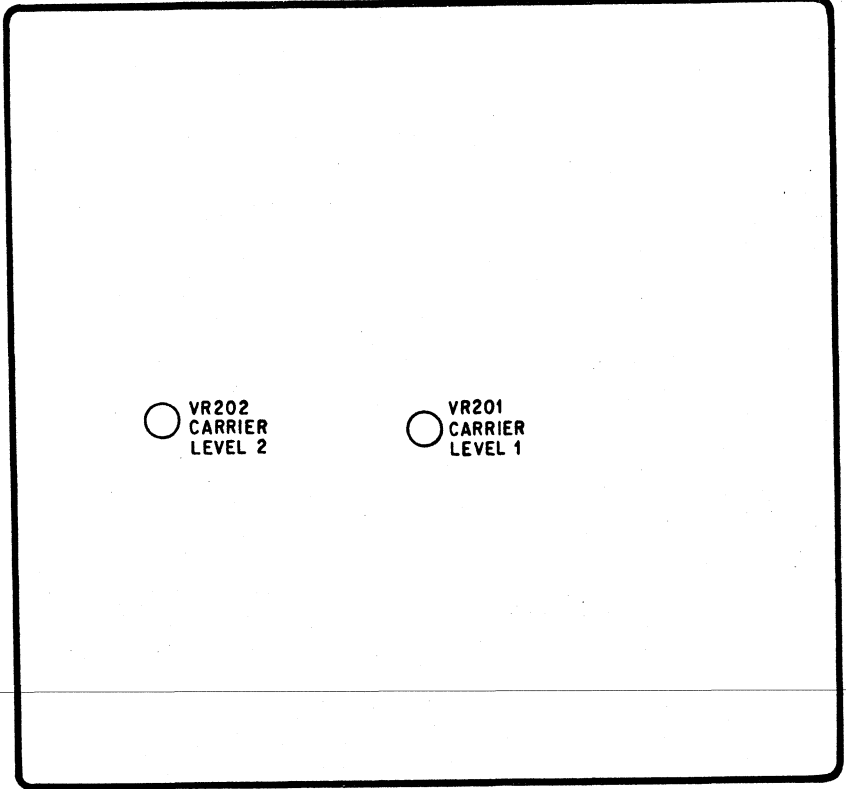
- Connect the Standard Signal Generator and the oscilloscope (CH1) to the MPX Output Connector 1.
- Connect the Oscilloscope (CH2) to the MPX Input Connector 1 with 75ohms termination.
- Set the frequency of the Standard Signal Generator at $11.7 \text{ MHz} \pm 10 \text{ KHz}$.
- Set the output of the Standard Signal Generator at 300mVp-p observing the oscilloscope CH1.
- Adjust VR202 (Carrier level 2) on the Interface Board so that the MPX Input Connector level becomes 300mVp-p $\pm 5 \text{ mVp-p}$ observing the oscilloscope (CH2).
- Set the frequency of the Standard Signal Generator at $11.2 \text{ MHz} \pm 10 \text{ KHz}$.
- Confirm the Camera Input Connector level is less than 10mVp-p by the oscilloscope (CH 2).

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

MICROPROCESSOR BOARD

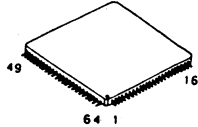


INTERFACE BOARD

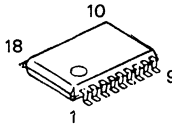


APPEARANCE OF IC, TRANSISTOR AND DIODE

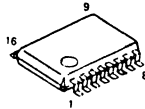
75P116F509
YWCF37801PG



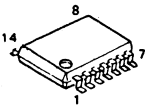
AN90B20



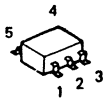
AN90B21S
MN4053BS



MN74HC02S
MN74HC08S
MN74HC27S
MN74HC74S



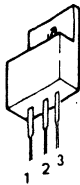
YWTC7S02F
YWTC7S04F
YWTC7S08F



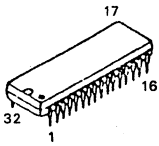
N51951ASL



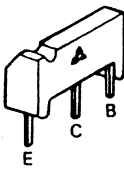
YWNJM78M12FA
YWNJM78M05FA



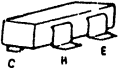
YWM50455001S



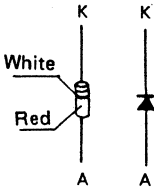
2SD636-QRS
2SB641-QR



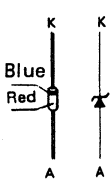
2SA1022-C
2SB709-RS
2SC2404-CD
2SD601-RS
2SD636-QRS
UN2111
UN2211



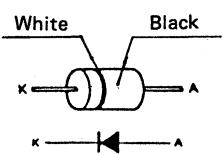
MA165



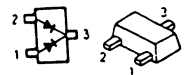
YWRD5.1JSB2



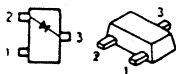
YWERA1501
SIB01-02



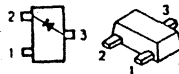
MA151WK



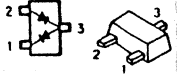
MA151K



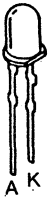
MA151A



MA157TW



LN48YP
LN29RD
SLH38MC



LN242RP



CHIP COMPONENTS

1. Chip Transistor

The transistor number is indicated on the top surface of the chip transistor using two alphabet letters or one numerical and two alphabet letters.



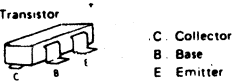
Transistor Number

Letter	Transistor No.	Letter	Transistor No.
A	2SB709	X	2SD602A
B	2SB709A	Y	2SD601
C	2SB710	Z	2SD601A
D	2SB710A	1Z	2SD1030
E	2SA1022	1N	2SK199
F	2SA1034	1O	2SK198
H	2SA1035	1A	2SB799
I	2SB792	1B	2SB814
K	2SC2778	1C	2SB902
P	2SD814	1F	2SK321
Q	2SD813	1L	2SK247
R	2SC2480	1K	2SK316
S	2SC2405	1M	2SJ84
T	2SC2406	1T	2SC3077
U	2SC2404	1X	2SC2845
V	2SC2295	2B	2SK374
W	2SD602	2C	2SK116

Example

WQ → 2SD602 – Q
YQ → 2SD601 – Q
1BS → 2SB814 – S

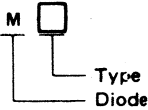
Appearance and Symbols



	1	2	3
Except 2SK199	Drain	Source	Gate
2SK199	Gate	Drain	Source

2. Chip Diode

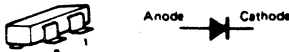
The diode number is indicated on the top surface of the chip diode using Two alphabet letters.



Diode Number

Letter	Diode No.	Letter	Diode No.
MA	MA151A	MI	MA152K
MB	MA152A	MK	MA28W-B
MC	MA153	ML	MA28T-A
MD	MA28-A	MN	MA151WA
ME	MA28-B	MO	MA152WA
MF	MA28W-A	MT	MA151WK
MH	MA151K	MU	MA152WK

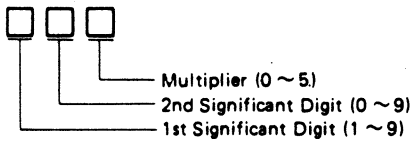
Appearance and Symbols



	1	2	3
MA28/28W/28T	–	Anode	Cathode
MA151K/152K	–	Anode	Cathode
MA151A/152A	–	Cathode	Anode
MA151WK/MA152WK	Anode	Anode	Cathode
MA151WA/MA152WA	Cathode	Cathode	Anode
MA153	Cathode	Anode	Common

3. Chip Resistor

The resistor value is indicated on the bottom surface of the chip resistor using three digit numbers.



EXAMPLE:

330 → 33 × 10⁰ = 33 ohms
561 → 56 × 10¹ = 560 ohms
123 → 12 × 10³ = 12 kohms

Note: Zero ohm resistor (jumper chip) is colored red or green.

4. Chip Capacitor

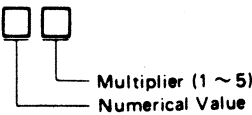
The capacitive value of replacement chip capacitors is indicated on the bottom surface. Original parts do not have value indication.

If the capacitive value is less than 100 pF, the value will be indicated by one or two digit number expressing the capacity directly in pF.

EXAMPLE:

0.5 → 0.5 pF 2.5 → 2.5 pF
75 → 0.75 pF 33 → 33 pF
1 → 1 pF 82 → 82 pF

If the capacitive value is 100 pF or greater, the value will be indicated by an alpha-numeric code. The letter precedes the number and expresses a numerical value to be multiplied by the number which follows.



Numerical Value

Letter	Value	Letter	Value
A	10	N	33
B	11	P	36
C	12	Q	39
D	13	R	43
E	15	S	47
F	16	T	51
G	18	U	56
H	20	V	62
J	22	W	68
K	24	X	75
L	27	Y	82
M	30	Z	91

* Letters I and O are not used

EXAMPLE:

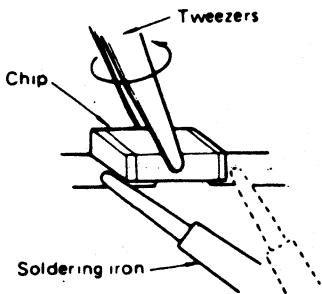
A1 → 10 × 10¹ = 100 pF
N2 → 33 × 10² = 3300 pF
S3 → 47 × 10³ = 47000 pF

5. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF when replacing the chip.
2. Use tweezers to prevent any damage to the chip surface.
3. Do not re-use the chips after removal
4. Do not rub the electrode of chips
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron to be used
7. The solder whose diameter is less than 0.5 mm is recommended
8. Do not heat the chip beyond 3 seconds
9. Maintain temperature control under 260°C (500°F) when soldering

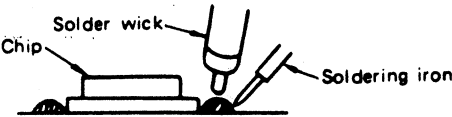
5-1 Removal (Transistor, Diode, Resistor and Capacitor)

1. Add the solder to both ends of the chip (three leads for chip transistor).
 2. While attaching the soldering iron to both ends of the chip (three leads for chip transistor) as shown below, remove the chip by turning it with tweezers
- Note Be careful not to damage other chips

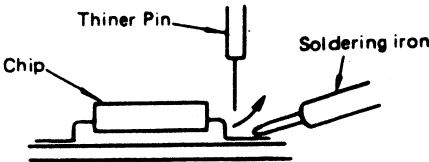


5-2 Removal (IC)

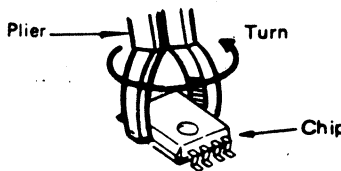
1. Add the solder wick and solder iron to each lead of the IC and remove solder.



2. Add the solder iron to each lead of the IC and left each lead of the IC using thinner pin.

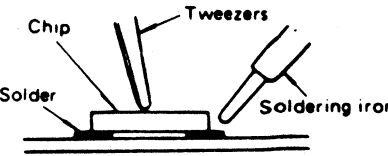


3. Remove IC turning it with plier.

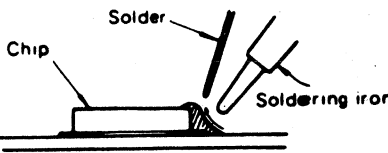


5-3 Mounting

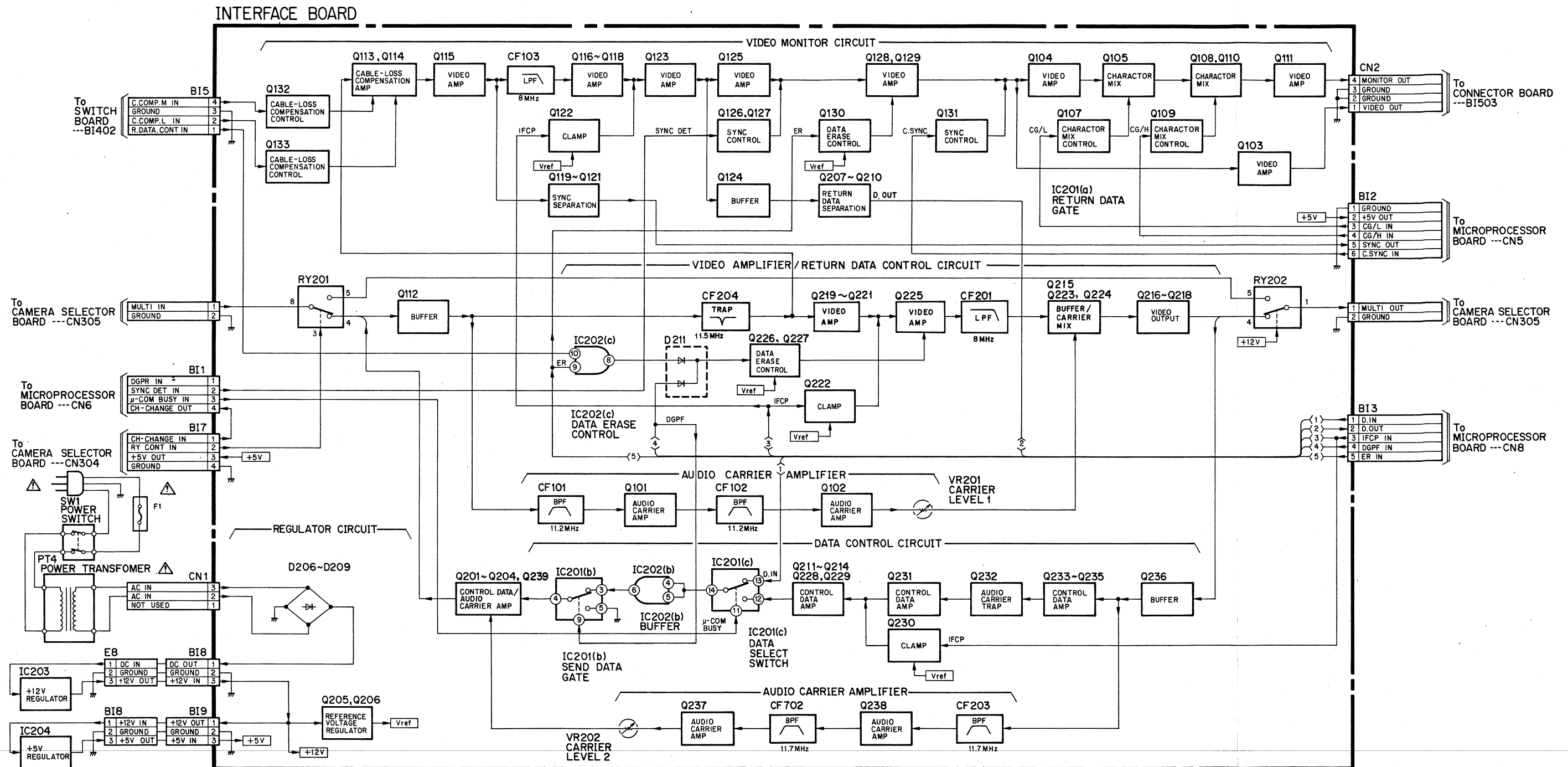
1. Place the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers



3. Solder both ends of chip (three leads for chip transistor)

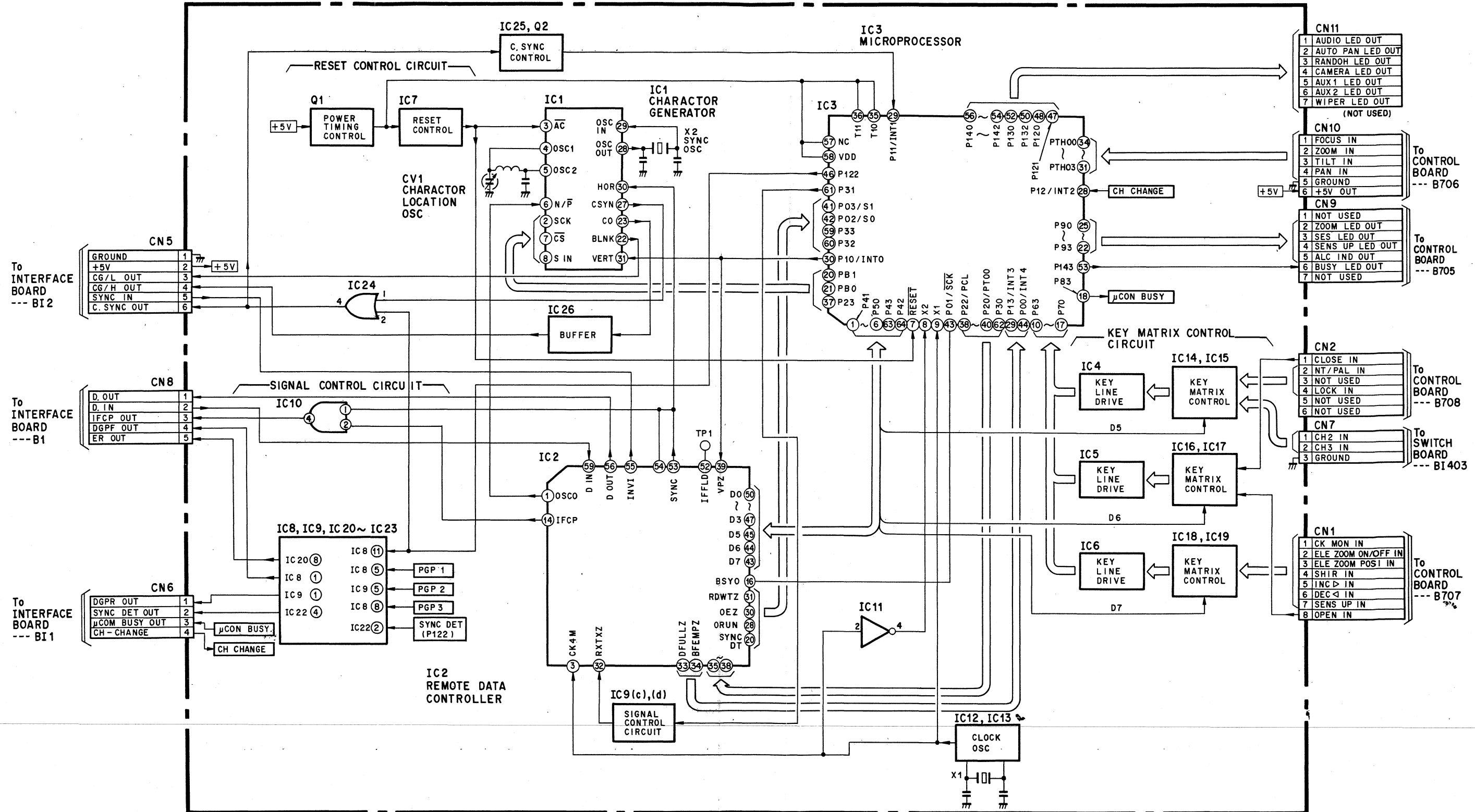


BLOCK DIAGRAM OF INTERFACE BOARD



BLOCK DIAGRAM OF MICROPROCESSOR BOARD

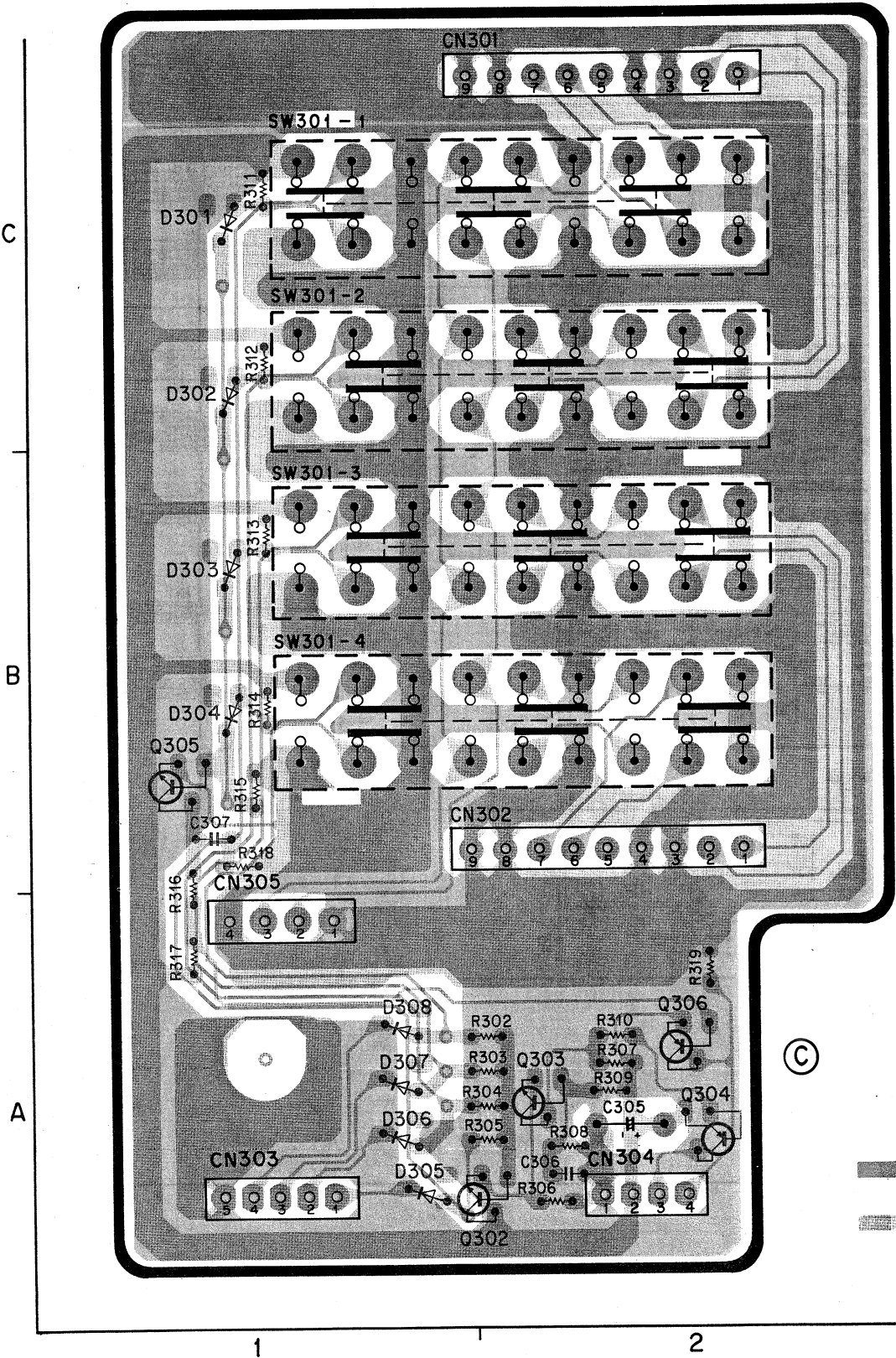
MICROPROCESSOR BOARD



CONDUCTOR VIEW OF CAMERA SELECTOR BOARD

SCHEMATIC DIAGRAM OF CAMERA

CAMERA SELECTOR BOARD



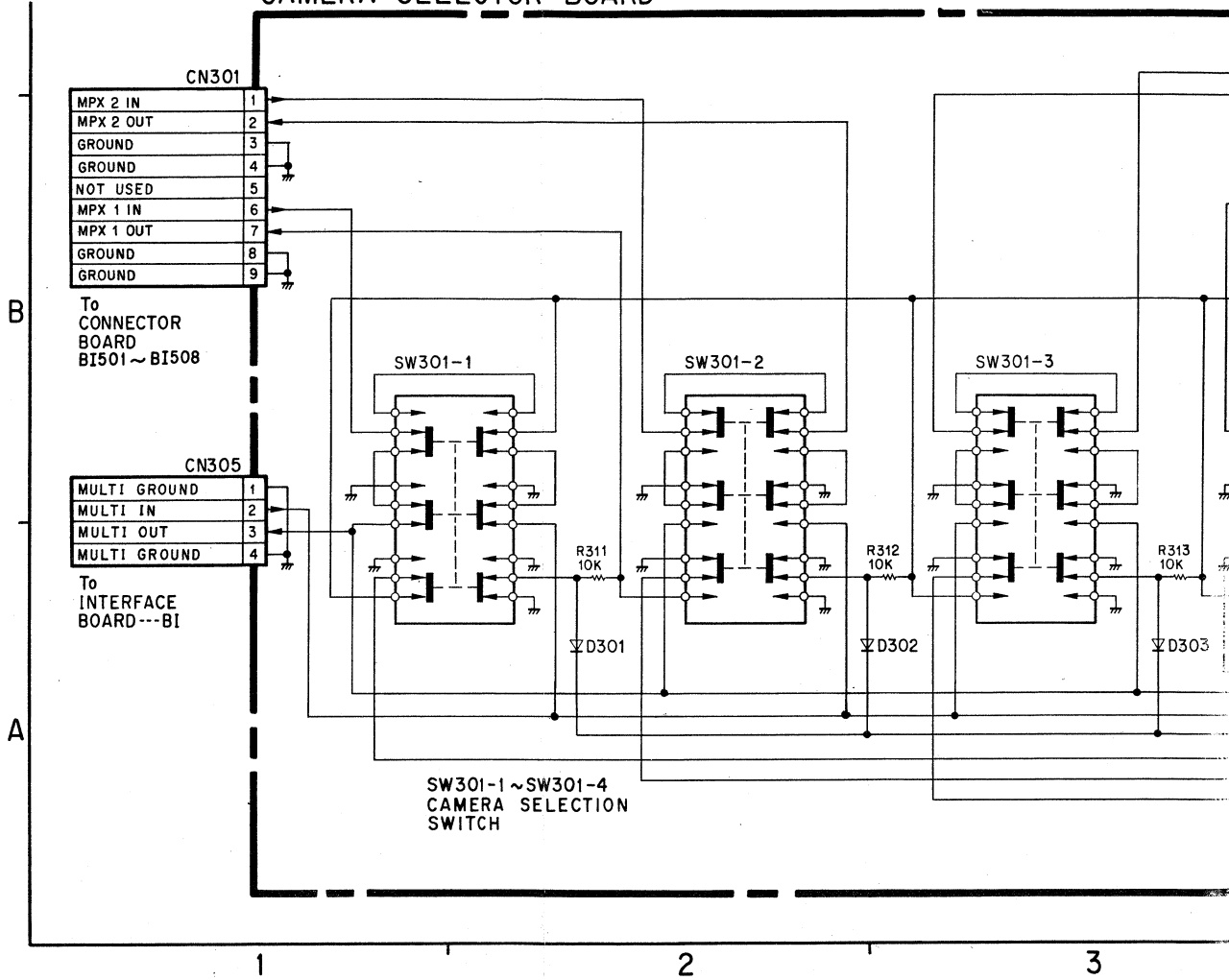
<ADDRESS INFORMATION>

Q302	A2
Q303	A2
Q304	A2
Q305	B1
Q306	A2
D301	C1
D302	C1
D303	B1
D304	B1
D305	A1
D306	A1
D307	A1
D308	A1

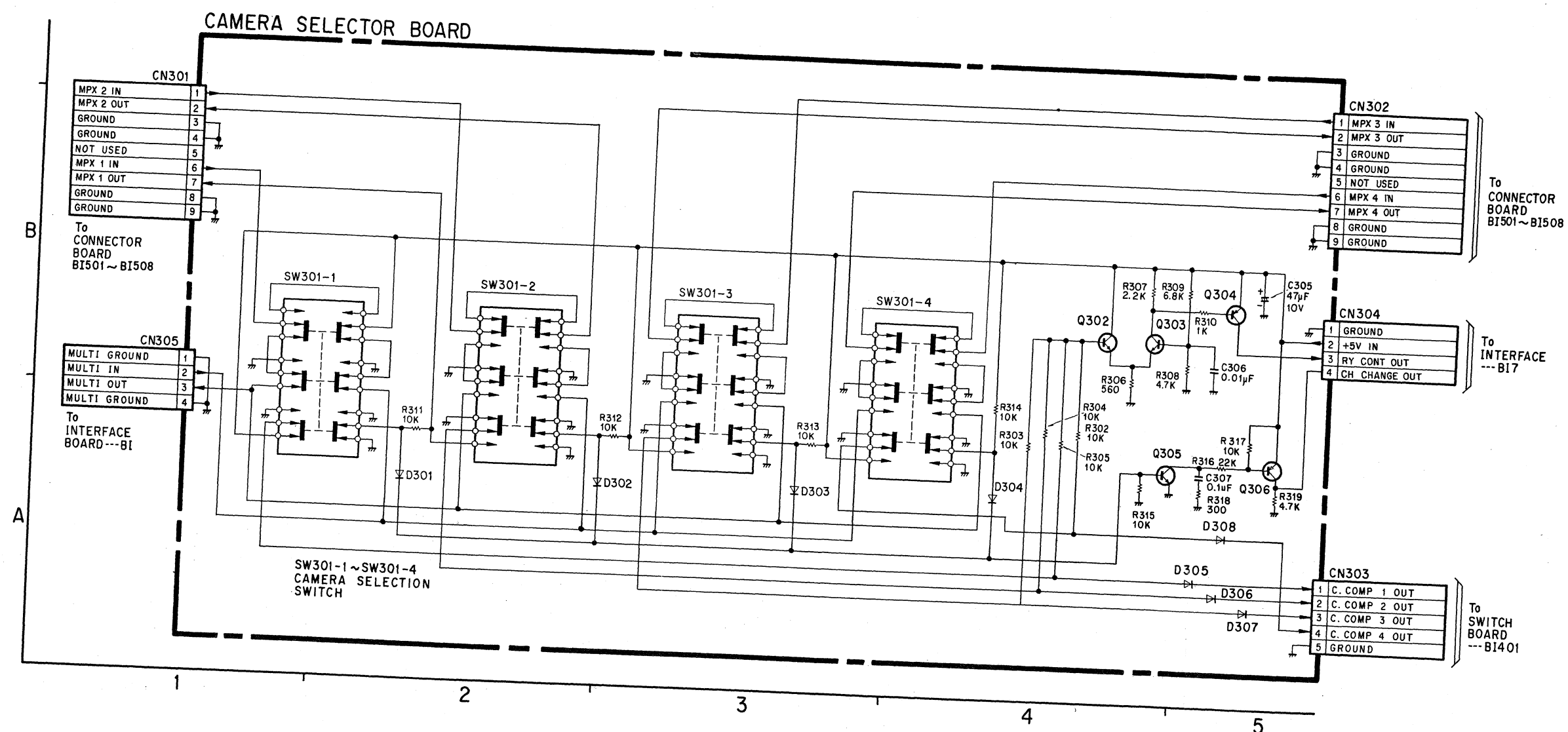
<VOLTAGES>

	B	C
Q302	0	0
Q303	2.0	2.8
Q304	0	4.8
Q305	0	5.0
Q306	5.0	0

CAMERA SELECTOR BOARD



SCHEMATIC DIAGRAM OF CAMERA SELECTOR BOARD



<ADDRESS INFORMATION>

Q302	A2
Q303	A2
Q304	A2
Q305	B1
Q306	A2
D301	C1
D302	C1
D303	B1
D304	B1
D305	A1
D306	A1
D307	A1
D308	A1

<VOLTAGES>

	B	C	E
Q302	0	0	1.4
Q303	2.0	2.8	1.4
Q304	0	4.8	0
Q305	0	5.0	0
Q306	5.0	0	5.0

<ADDRESS INFORMATION>

Q302	B4
Q303	B4
Q304	B5
Q305	A4
Q306	A5
D301	A2
D302	A3
D303	A3
D304	A4
D305	A5
D306	A5
D307	A5
D308	A5

SCHEMATIC DIAGRAM OF INTERFACE BOARD

<VOLTAGES>

	B	C	E
Q101	2.5	10.6	1.7
Q102	6.1	11.6	5.3
Q103	3.6	10.3	3.0
Q104	3.6	11.6	3.0
Q105	3.0	0	3.6
Q106	11.1	0	3.6
Q107	0	10.6	0
Q108	3.6	11.6	3.0
Q109	0	11.6	3.0
Q110	3.0	0	3.6
Q111	3.6	10.3	3.0
Q112	6.3	11.6	5.7
Q113	3.1	10.6	2.4
Q114	10.6	5.3	11.3
Q115	5.3	11.6	4.6
Q116	2.6	11.6	2.0
Q117	1.9	9.8	1.3
Q118	9.8	11.6	9.2
Q119	9.2	11.6	8.6
Q120	11.7	0.9	11.6
Q121	0.4	5.1	0.3
Q122	0.2	2.9	2.5
Q123	2.9	0	3.5
Q124	3.5	11.6	2.9
Q125	3.5	11.6	2.9
Q126	8.5	2.9	8.5
Q127	0	8.5	0
Q128	2.9	0	3.6
Q129	10.8	0	3.6
Q130	0.1	10.8	2.5
Q131	0	3.6	0
Q132	0	2.4	0
Q133	0	2.4	0

	IC201	IC202	IC203	IC204
Pin 1	0	5.1	20.0	11.7
2	0	5.1	0	0
3	-	5.1	11.7	5.1
4	0.1	-		
5	0	-		
6	0	-		
7	0	0		
8	0	0		
9	0.1	0		
10	0.1	5.1		
11	-	5.1		
12	2.2	5.1		
13	0	5.1		
14	-	5.1		
15	0			
16	5.1			

<ADDRESS INFORMATION>

INTERFACE BOARD

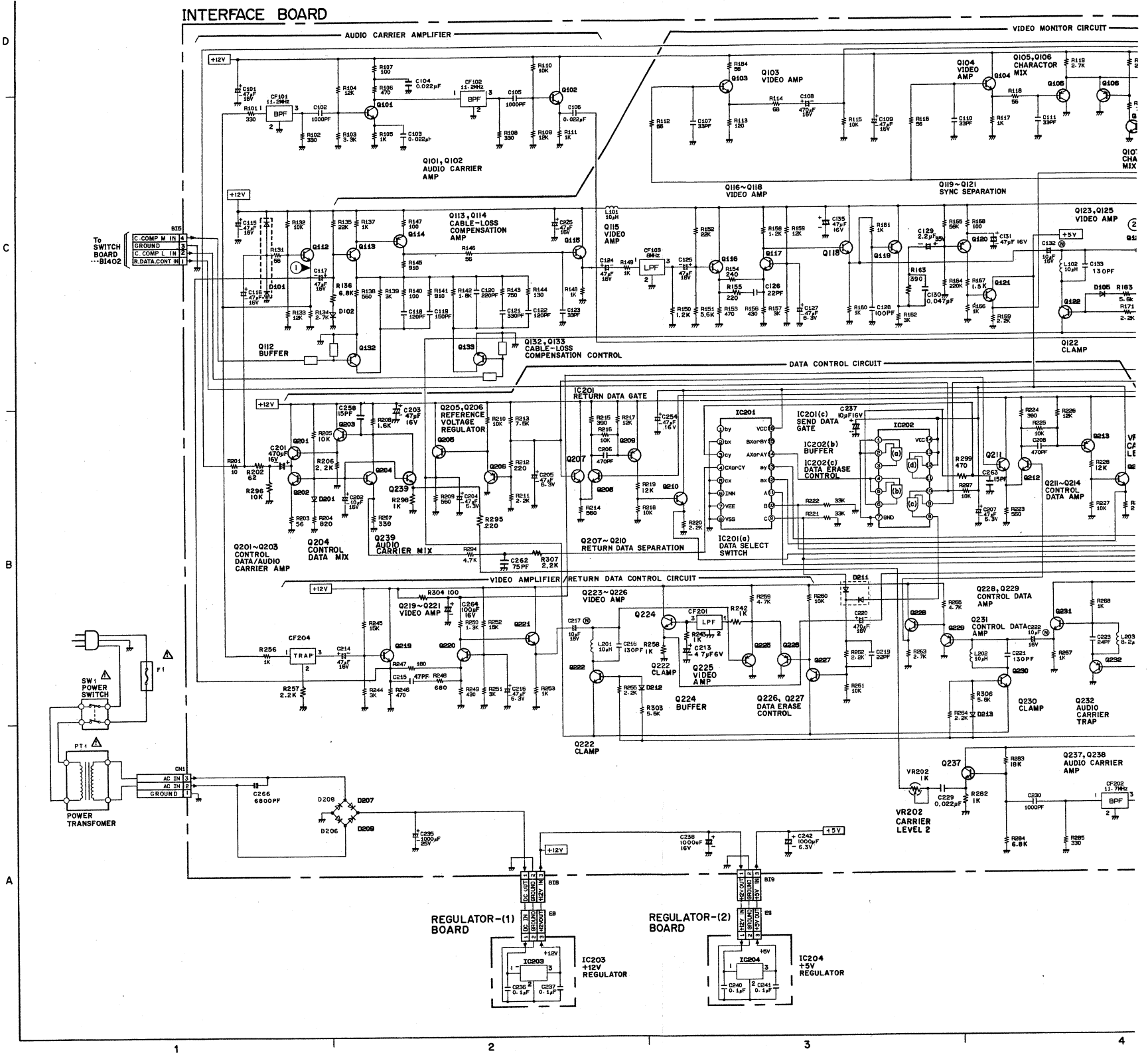
IC201	B3	Q229	B3
IC202	B3	Q230	B4
Q101	C2	Q231	B4
Q102	C2	Q232	B4
Q103	D3	Q233	B4
Q104	D4	Q234	B4
Q105	C4	Q235	B4
Q106	C4	Q236	B5
Q107	C4	Q237	A4
Q108	D4	Q238	A4
Q109	D4	Q239	B2
Q110	C5	D101	C1
Q111	D5	D102	C2
Q112	C1	D103	C5
Q113	C2	D104	C4
Q114	C2	D105	C4
Q115	C2	D201	B1
Q116	C3	D202	B5
Q117	C3	D203	B4
Q118	C3	D204	B5
Q119	C3	D205	B5
Q120	C4	D206	A2
Q121	C4	D207	A2
Q122	C4	D208	A2
Q123	C4	D209	A2
Q124	C4	D210	B5
Q125	C4	D211	B3
Q126	C4	D212	B2
Q127	C4	D213	B4
Q128	C5		
Q129	C5		
Q130	C5		
Q131	C5		
Q132	C2		
Q133	C2		
Q201	B1		
Q202	B1		
Q203	B2		
Q204	B2		
Q205	B2		
Q206	B2		
Q207	B2		
Q208	B2		
Q209	B2		
Q210	B3		
Q211	B4		
Q212	B4		
Q213	B4		
Q214	B4		
Q215	B4		
Q216	B5		
Q217	B5		
Q218	B5		
Q219	B2		
Q220	B2		
Q221	B2		
Q222	B2		
Q223	B4		
Q224	B3		
Q225	B3		
Q226	B3		
Q227	B3		
Q228	B3		

REGULATOR BOARD-1

IC203	A2
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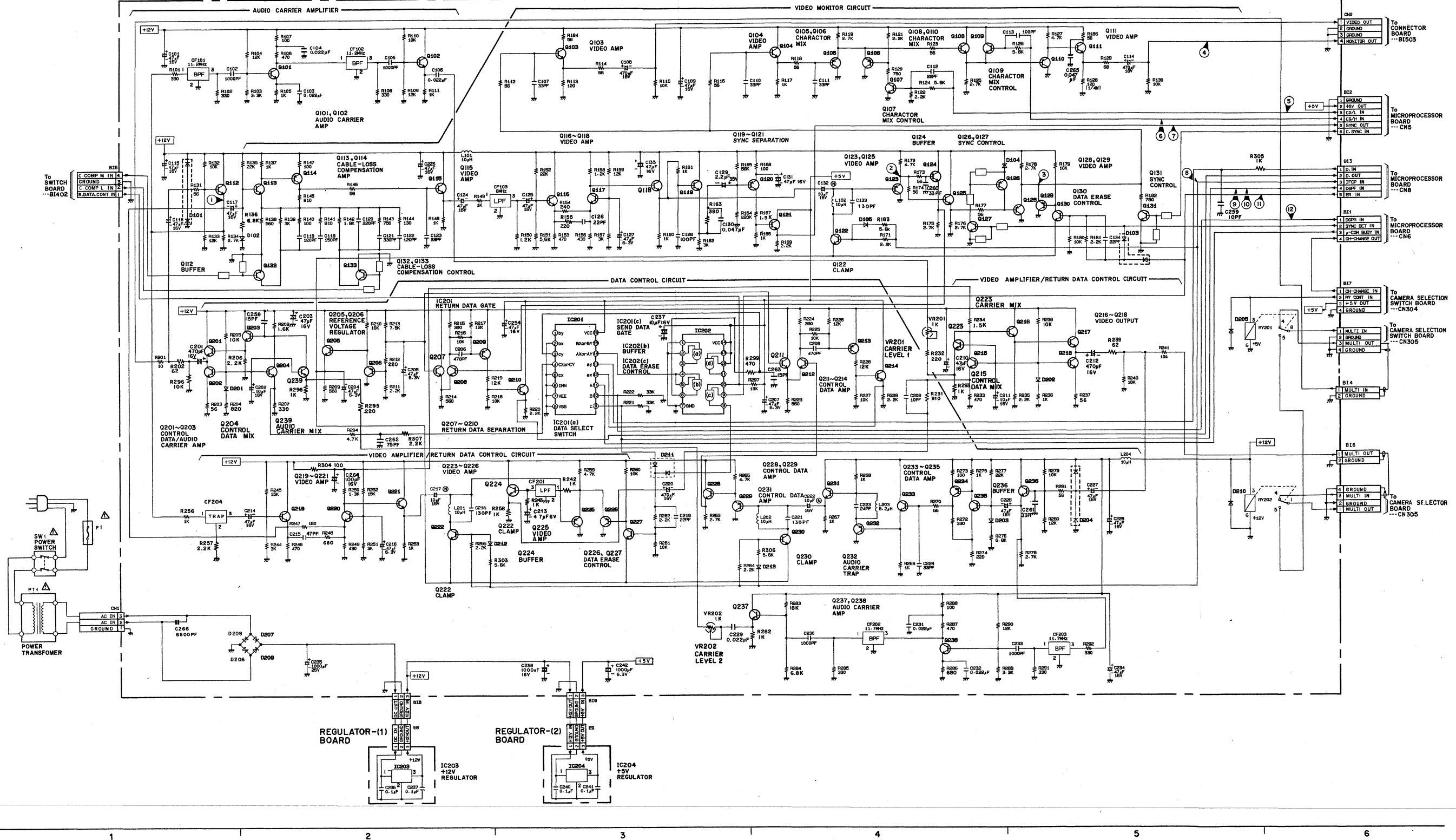
REGULATOR BOARD-2

IC204	A3
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SCHEMATIC DIAGRAM OF INTERFACE BOARD

INTERFACE BOARD

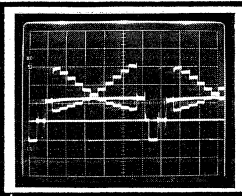


CONDUCTOR VIEW OF INTERFACE BOARD

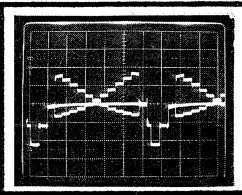
<WAVEFORMS>

INTERFACE BOARD

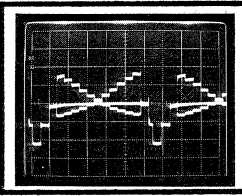
1. 10μsec/DIV, 0.2V/DIV



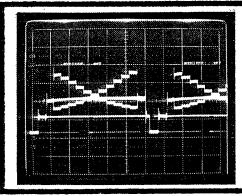
2. 10μsec/DIV, 0.5V/DIV



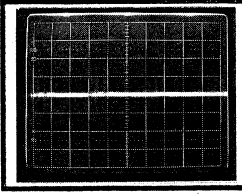
3. 10μsec/DIV, 0.5V/DIV



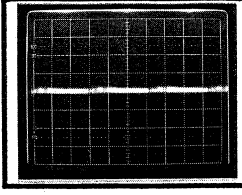
4. 10μsec/DIV, 0.2V/DIV



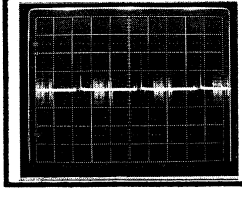
5. 20μsec/DIV, 0.2V/DIV



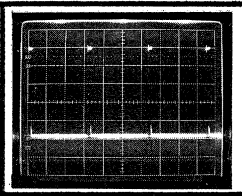
6. 20μsec/DIV, 0.2V/DIV



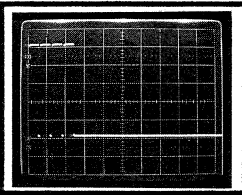
7. 20μsec/DIV, 0.5V/DIV



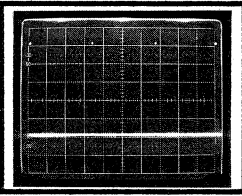
8. 20μsec/DIV, 1V/DIV



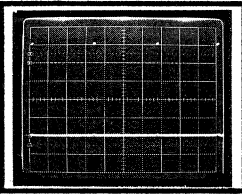
9. 0.1msec/DIV, 1V/DIV



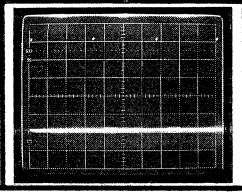
10. 5msec/DIV, 1V/DIV



11. 5msec/DIV, 1V/DIV



12. 5msec/DIV, 1V/DIV



<ADDRESS INFORMATION>

INTERFACE BOARD

IC201	D3
IC202	C3
Q101	D4
Q102	C4
Q103	B5
Q104	B5
Q105	B5
Q106	B5
Q107	B5
Q108	B5
Q109	B5
Q110	B5
Q111	A5
Q112	D4
Q113	D4
Q114	D4
Q115	D5
Q116	C5
Q117	C5
Q118	C5
Q119	C5
Q120	D5
Q121	D5
Q122	B4
Q123	B5
Q124	D5
Q125	C5
Q126	C5
Q127	C5
Q128	C5
Q129	C5
Q130	C5
Q131	B5
Q132	D4
Q133	D5
Q201	D3
Q202	D3
Q203	D3
Q204	D3
Q205	B5
Q206	B5
Q207	D5
Q208	D5
Q209	D5
Q210	D5
Q211	C3
Q212	C3
Q213	C3
Q214	C3
Q215	B4
Q216	B4
Q217	B5
Q218	B4
Q219	C4
Q220	C4
Q221	C4
Q222	C4
Q223	B4
Q224	B4
Q225	C4
Q226	C4
Q227	B4
Q228	C3

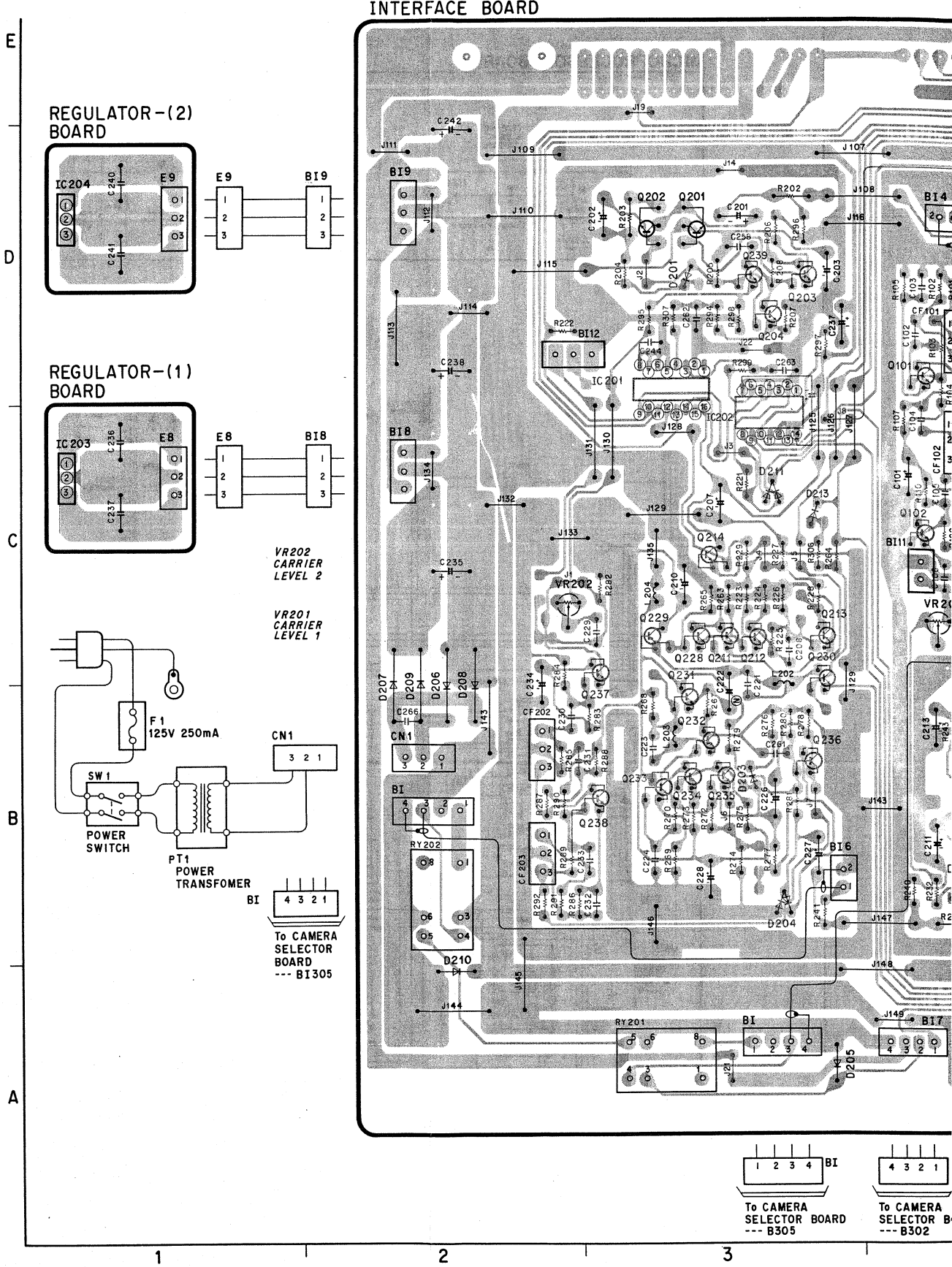
Q229	C3
Q230	C3
Q231	B3
Q232	B3
Q233	B3
Q234	B3
Q235	B3
Q236	B3
Q237	C3
Q238	B3
Q239	D3
D101	D4
D102	D4
D103	C5
D104	C5
D105	B5
D201	D3
D202	B4
D203	B3
D204	B3
D205	A3
D206	B2
D207	B2
D208	B2
D209	B2
D210	A2
D211	C3
D212	B4
D213	C3

REGULATOR BOARD-1

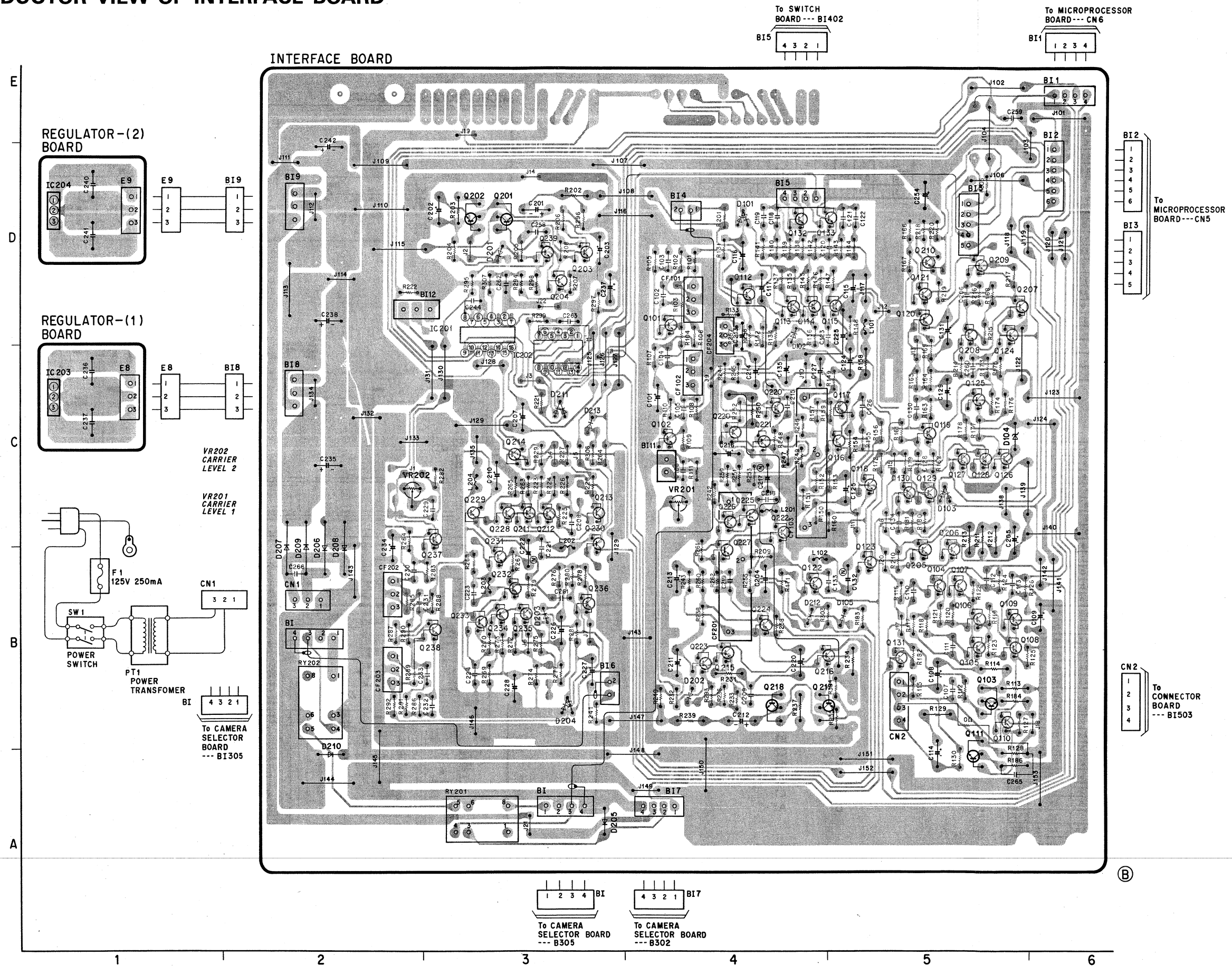
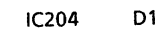
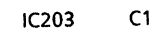
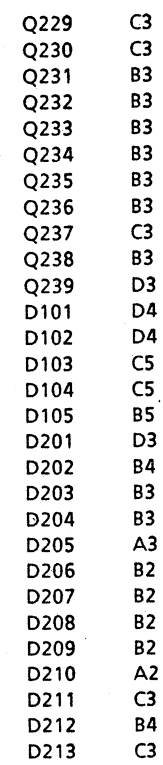
IC203	C1
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REGULATOR BOARD-2

IC204	D1
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CONDUCTOR VIEW OF INTERFACE BOARD



SCHEMATIC DIAGRAM OF MICROPROCESSOR BOARD

<VOLTAGES>

	IC4	IC5	IC6	IC8	IC9	IC14	IC15	IC16	IC17	IC18	IC19	IC20	IC21
Pin 1	0	0	0	0.1	0.1	0	0	0	0	0	0	5.0	5.0
2	0	0	0	5.0	5.0	0	5.0	5.1	5.1	5.1	5.1	0	0
3	0.1	0	0	4.9	4.9	4.8	4.8	4.8	4.8	0	4.8	0	5.0
4	0	0	0	5.0	5.0	0	0	0	0	0	0	0	5.1
5	0	0	0	0	0.1	5.1	0	5.1	5.1	5.1	5.1	0.2	0
6	0	0	0	0	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.9	5.1
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0.2	5.0	5.1	5.1	5.1	5.1	5.1	5.1	0.2	5.1
9	0	0	0	0	-	4.8	4.8	4.8	4.8	4.8	4.8	4.9	0
10	0	0	0	4.9	0	0	0	0	0	0	0	0	5.1
11	4.5	4.5	4.5	5.0	0	5.1	5.1	5.1	5.1	5.1	5.1	0	0
12	4.5	4.5	4.5	0	0	4.8	4.8	4.8	4.8	4.8	4.8	0	0
13	4.5	4.5	4.5	0	5.1	0	0	0	0	0	0	0.1	5.1
14	4.5	4.5	4.5	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
15	5.0	5.0	5.0										
16	5.0	5.0	5.0										
17	5.0	5.0	5.0										
18	5.0	5.0	5.0										

	IC7	IC10	IC11	IC12	IC13	IC22	IC23	IC24	IC25	IC26
Pin 1	5.0	4.7	0	0	0	5.0	0.1	5.0	5.1	0
2	0	0.3	2.3	2.1	2.3	5.0	0.1	4.9	5.1	0
3	4.9	0	0	0	0	0	0	0	0	0
4	0.3	2.2	2.9	2.1	0	5.0	0	5.1	0	
5	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1

<ADDRESS INFORMATION>

MICROPROCESSOR BOARD

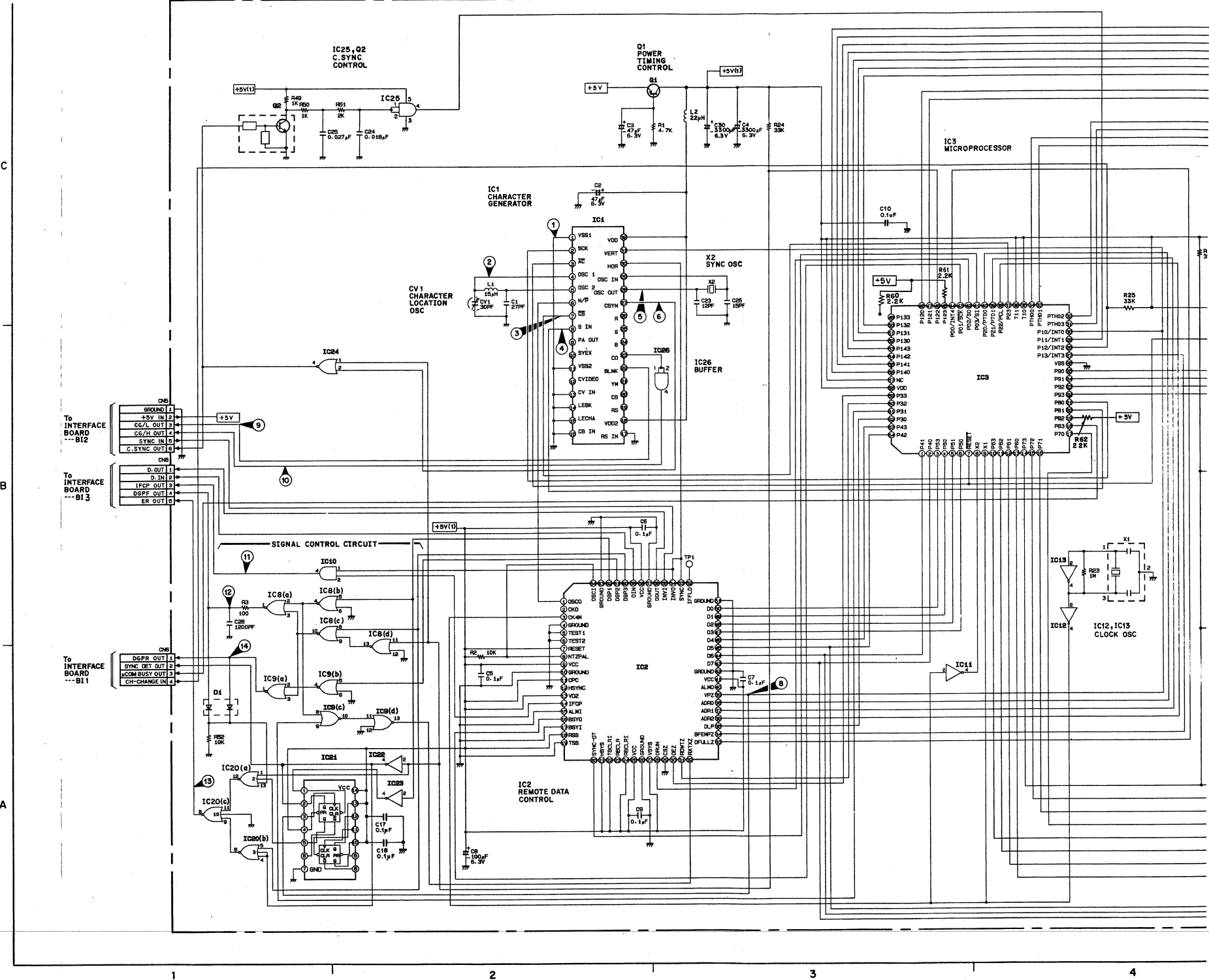
IC1	C2
IC2	A2
IC3	B4
IC4	B5
IC5	A5
IC6	A5
IC7	B5
IC8	A2, B1
IC9	A1, A2
IC10	B1
IC11	A3
IC12	B4
IC13	B4
IC14	B5
IC15	B5
IC16	A5, B5
IC17	A5
IC18	A5
IC19	A5
IC20	A1
IC21	A1
IC22	A2
IC23	A2
IC24	B1
IC25	C2
IC26	B3
Q1	C2
Q2	C1
D1	A1

	IC1	IC17
Pin 1	0	0
2	4.9	18 5.1
3	4.9	19 0
4	2.3	20 0
5	2.3	21 0
6	5.1	22 0
7	4.7	23 0
8	0	24 0
9	0.1	25 0
10	5.0	26 0
11	0	27 4.9
12	0	28 2.0
13	0	29 2.3
14	0	30 4.7
15	0	31 5.0
16	0	32 5.1

	B	C	E
Q1	4.3	5.0	5.1
Q2	0	5.1	0

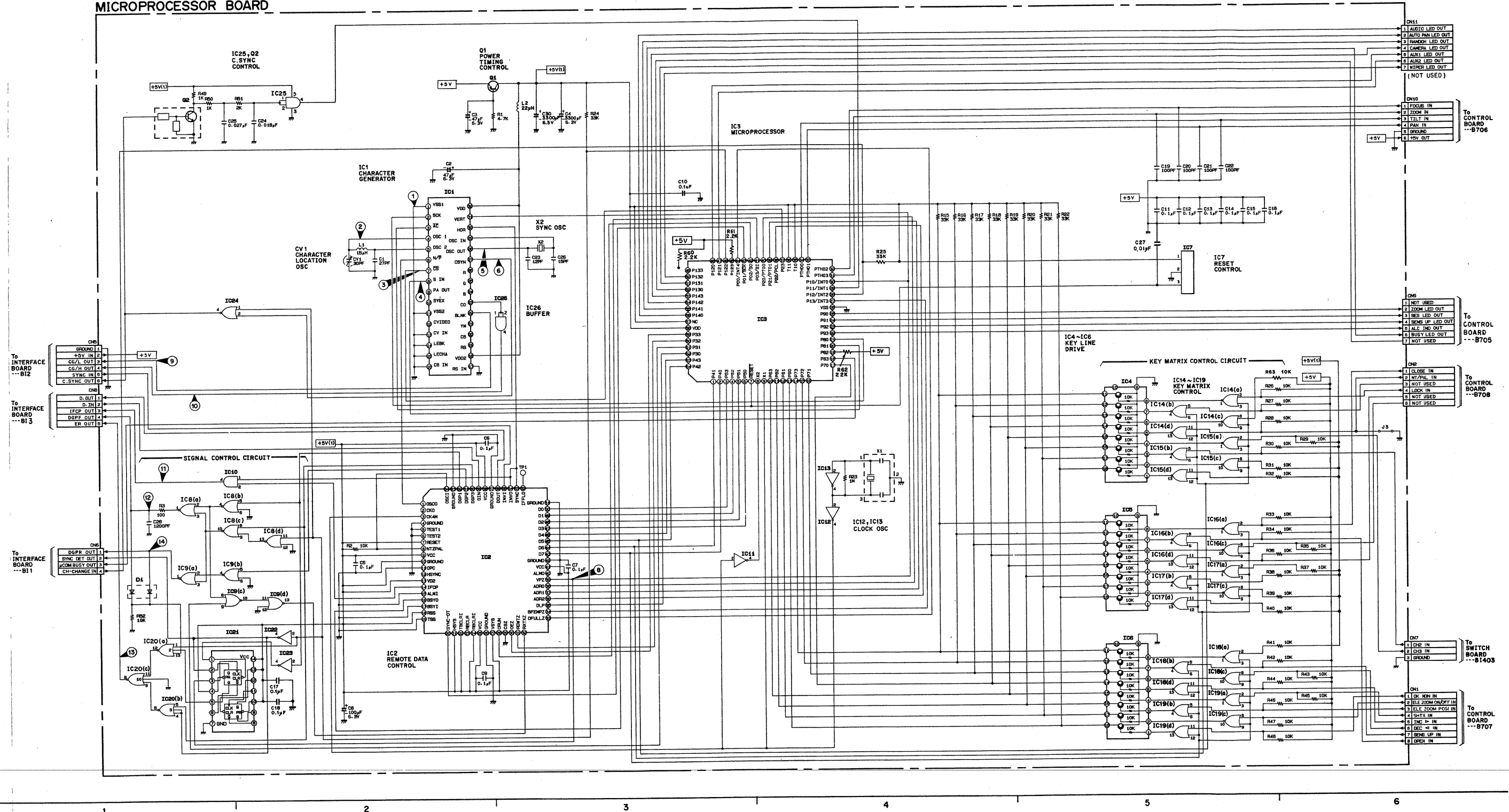
	IC2	IC3	IC2	IC3
Pin 1	5.1	4.8	Pin 33	5.1 2.5
2	0	4.8	34	0 2.5
3	2.9	0	35	5.0 5.0
4	0	0	36	5.0 5.0
5	0	0	37	5.0 4.7
6	0	0	38	5.0 -
7	5.1	4.9	39	5.0 5.0
8	0	2.2	40	0 5.0
9	5.1	2.9	41	5.1 5.1
10	0	5.0	42	0 0
11	5.1	5.0	43	4.8 0
12	4.7	5.0	44	4.8 5.1
13	5.1	5.0	45	4.8 5.1
14	0.3	4.6	46	0.1 5.0
15	0	4.5	47	0 0
16	0	4.5	48	0 0
17	0	4.5	49	0 0
18	5.1	-	50	0 0
19	0	5.0	51	0 5.1
20	5.1	0	52	0 0
21	5.1	4.9	53	4.7 0
22	0	0	54	4.7 0
23	5.1	0	55	0.3 0
24	5.1	0	56	0 0
25	5.1	0	57	0 0
26	0	0	58	5.1 5.0
27	5.1	-	59	0 5.0
28	0	5.0	60	0 5.0
29	0	5.1	61	0.1 -
30	5.0	5.0	62	0 5.0
31	5.0	2.5	63	0 0.1
32	5.1	2.5	64	0 4.8

MICROPROCESSOR BOARD



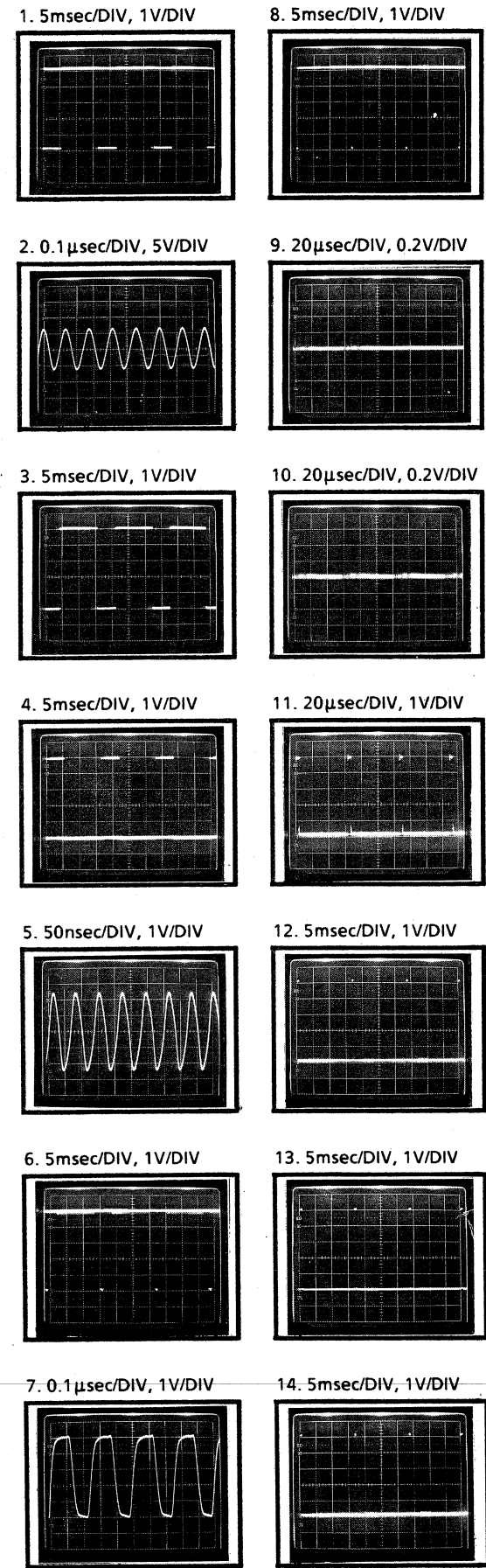
SCHEMATIC DIAGRAM OF MICROPROCESSOR BOARD

MICROPROCESSOR BOARD



CONDUCTOR VIEW OF MICROPROCESSOR BOARD

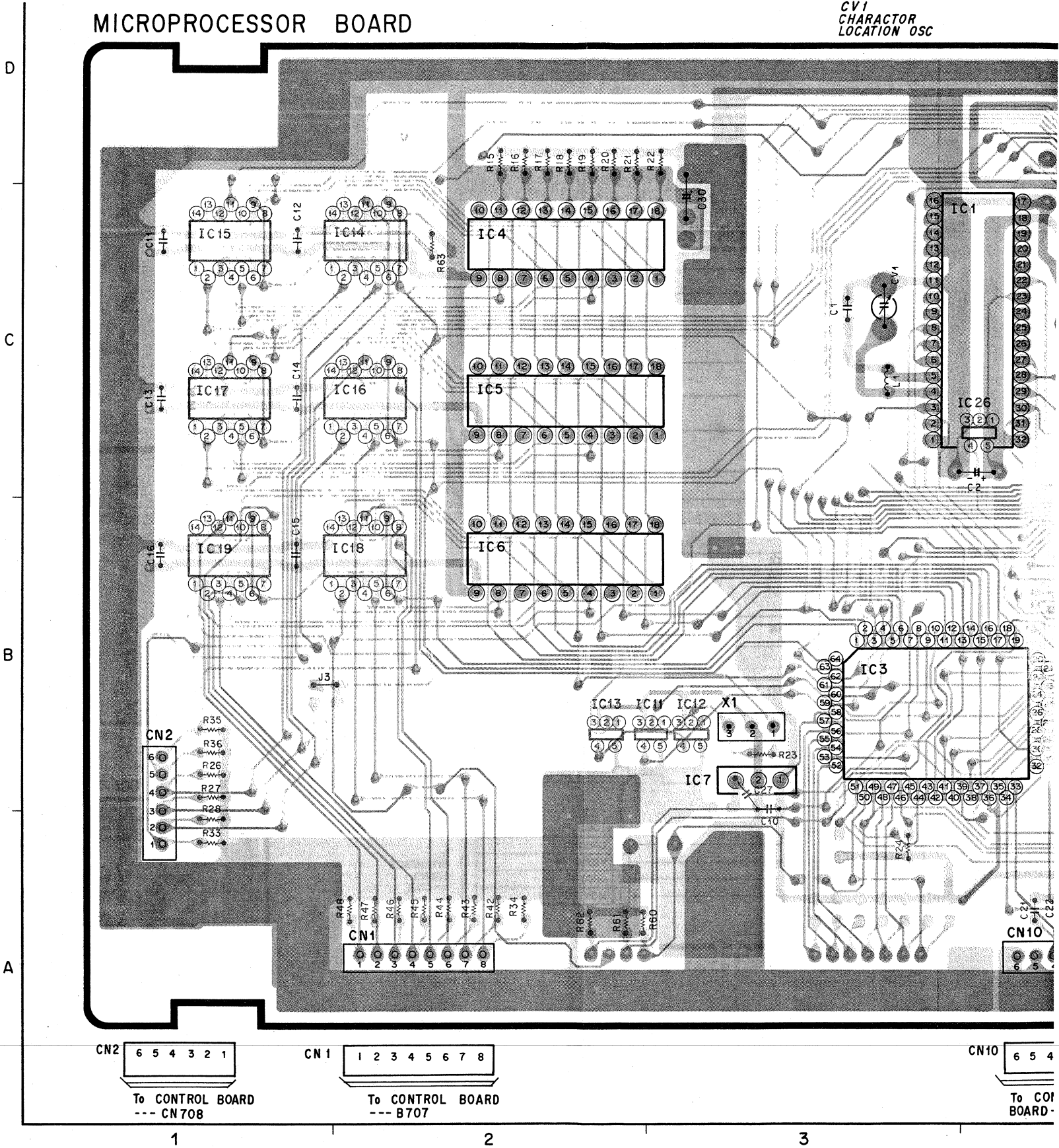
<WAVEFORMS> MICROPROCESSOR



<ADDRESS INFORMATION>

MICROPROCESSOR BOARD

IC1	C4
IC2	C4
IC3	B3
IC4	C2
IC5	C2
IC6	B2
IC7	B3
IC8	B5
IC9	B4
IC10	C5
IC11	B3
IC12	B3
IC13	B2
IC14	C2
IC15	C1
IC16	C2
IC17	C1
IC18	B2
IC19	B1
IC20	B5
IC21	B4
IC22	B5
IC23	B4
IC24	B4
IC25	C5
IC26	C4
Q1	D4
Q2	C5
D1	B4



CONDUCTOR VIEW OF MICROPROCESSOR BOARD

FORMATION>
OR BOARD

MICROPROCESSOR BOARD

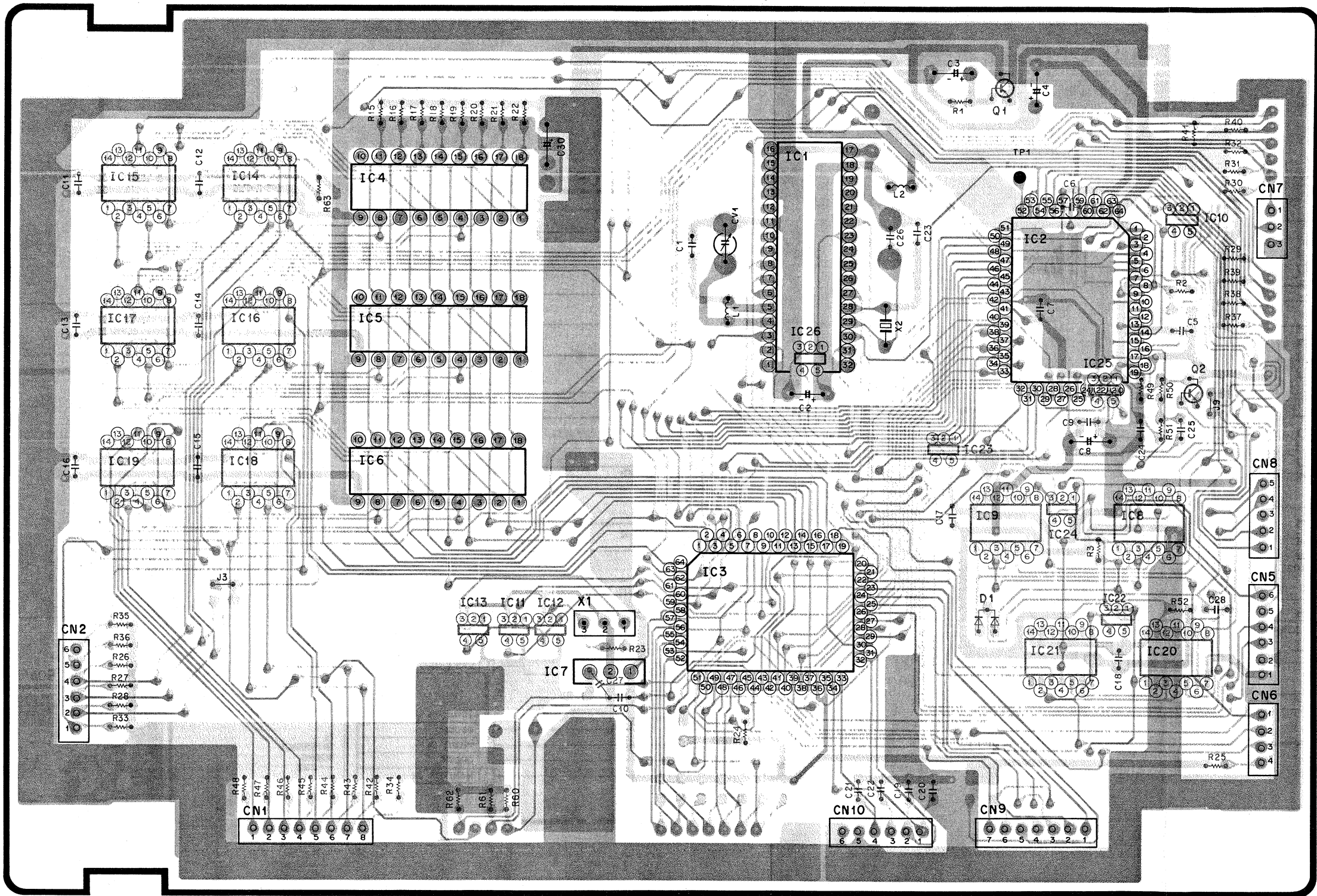
CV1
CHARACTOR
LOCATION OSC

D

C

B

A



CN7
1
2
3
To SWITCH BOARD
---BI 403

CN8
5
4
3
2
1
To INTERFACE BOARD
---BI3

CN5
6
5
4
3
2
1
To INTERFACE BOARD
---BI2

CN6
1
2
3
4
To INTERFACE BOARD
---BI1

CN2
6 5 4 3 2 1
To CONTROL BOARD
---CN708

CN1
1 2 3 4 5 6 7 8
To CONTROL BOARD
---B707

CN10
6 5 4 3 2 1
To CONTROL BOARD---B706

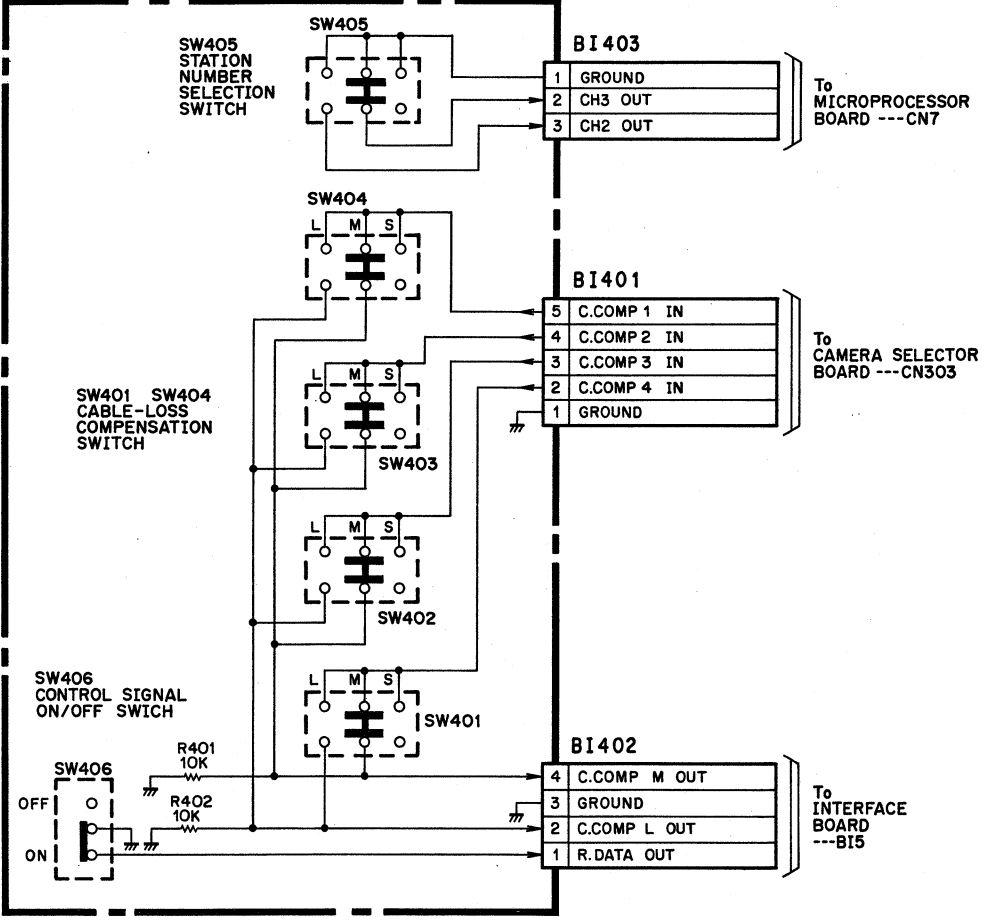
CN9
7 6 5 4 3 2 1
To CONTROL BOARD---B705

—w— COMPONENT SIDE
- - -w- - - PATTERN SIDE

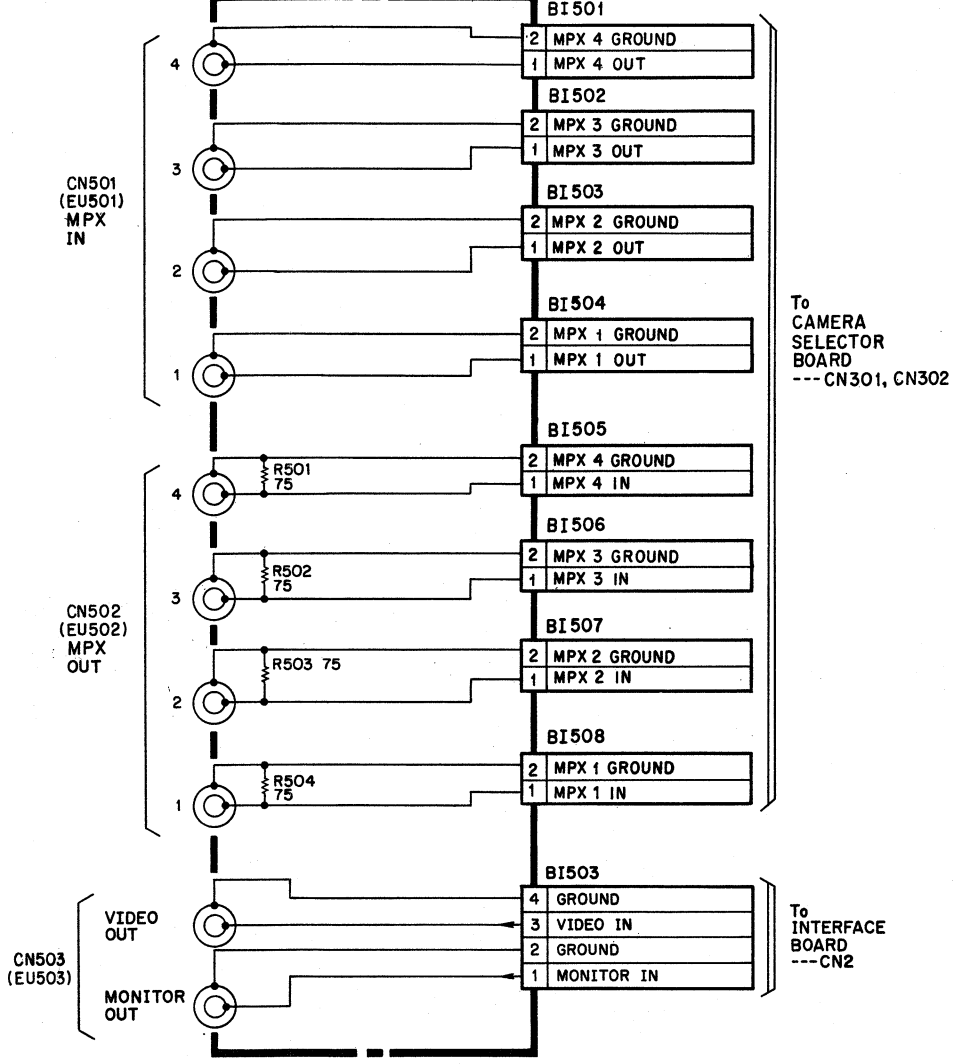
Ⓒ

SCHEMATIC DIAGRAM OF CONNECTOR BOARD, SWITCH BOARD

SWITCH BOARD

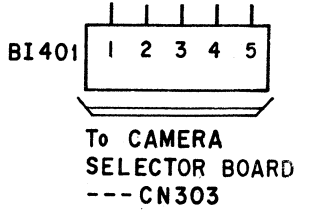
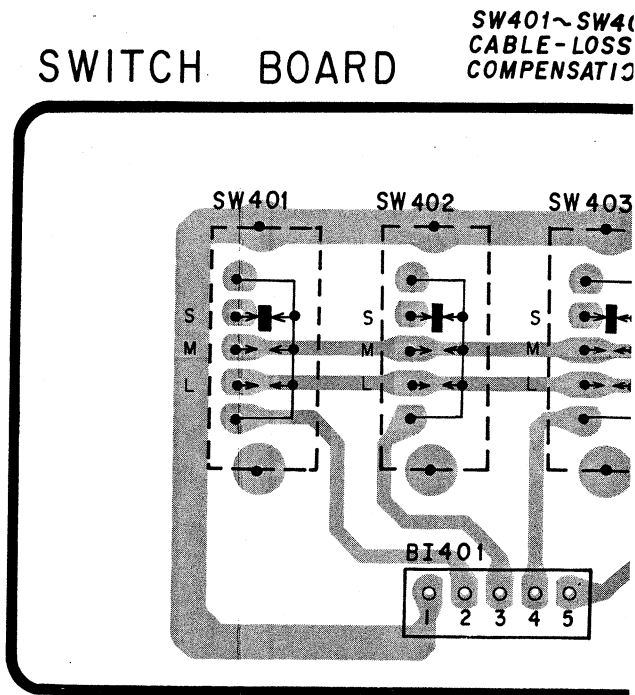


CONNECTOR BOARD

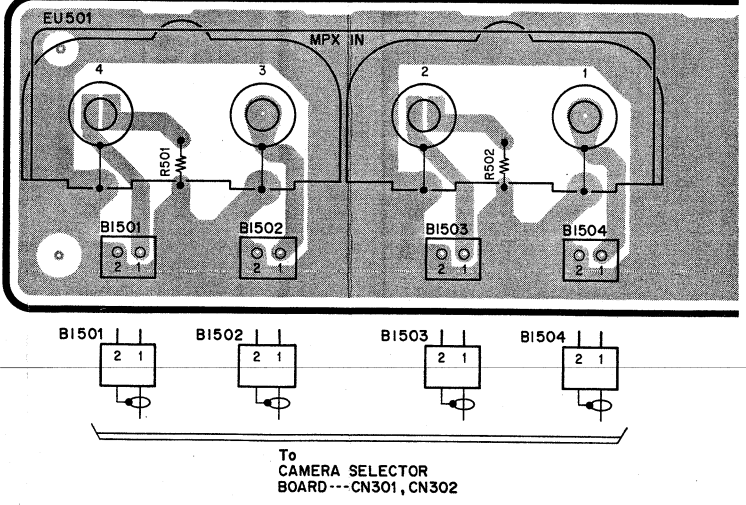


CONDUCTOR VIEW OF

SWITCH BOARD



CONNECTOR BOARD



OR BOARD, SWITCH BOARD

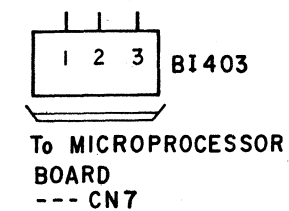
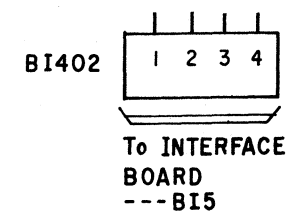
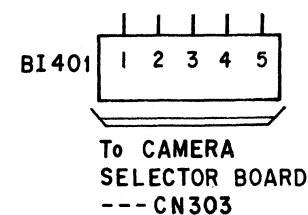
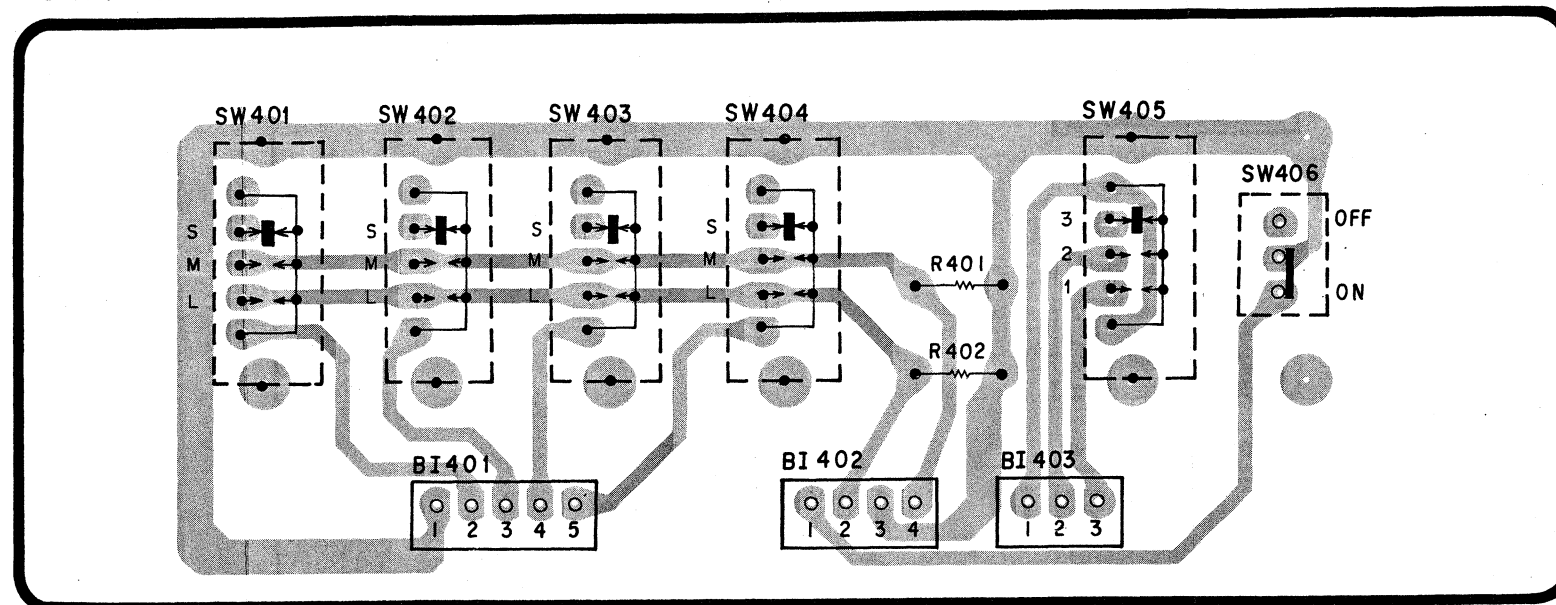
CONDUCTOR VIEW OF SWITCH BOARD, CONNECTOR BOARD

SWITCH BOARD

SW401~SW404
CABLE-LOSS
COMPENSATION SWITCH

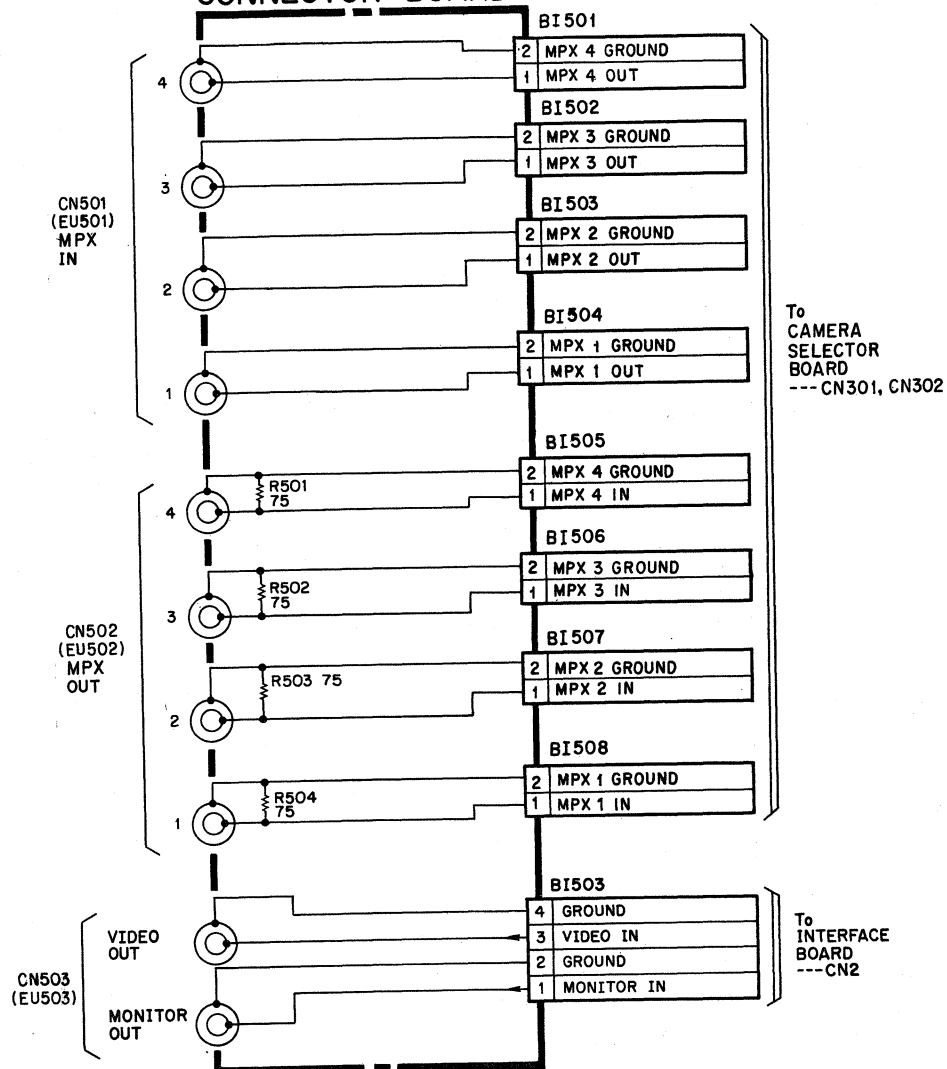
SW405
STATION NUMBER
SELECTION SWITCH

SW406
CONTROL SIGNAL
ON/OFF SWITCH

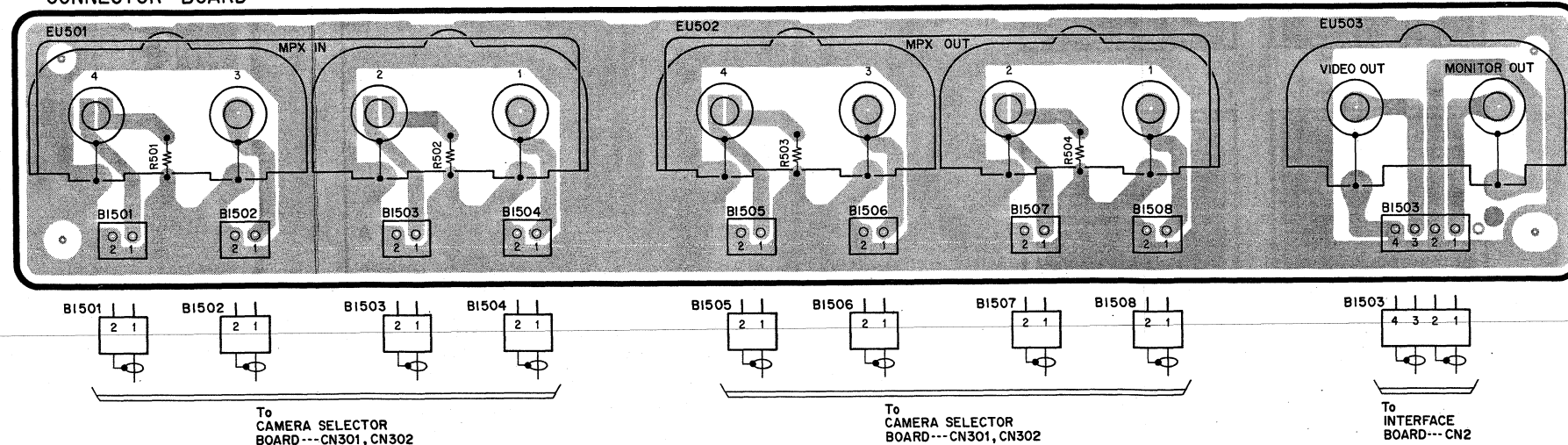


(B)

CONNECTOR BOARD



CONNECTOR BOARD

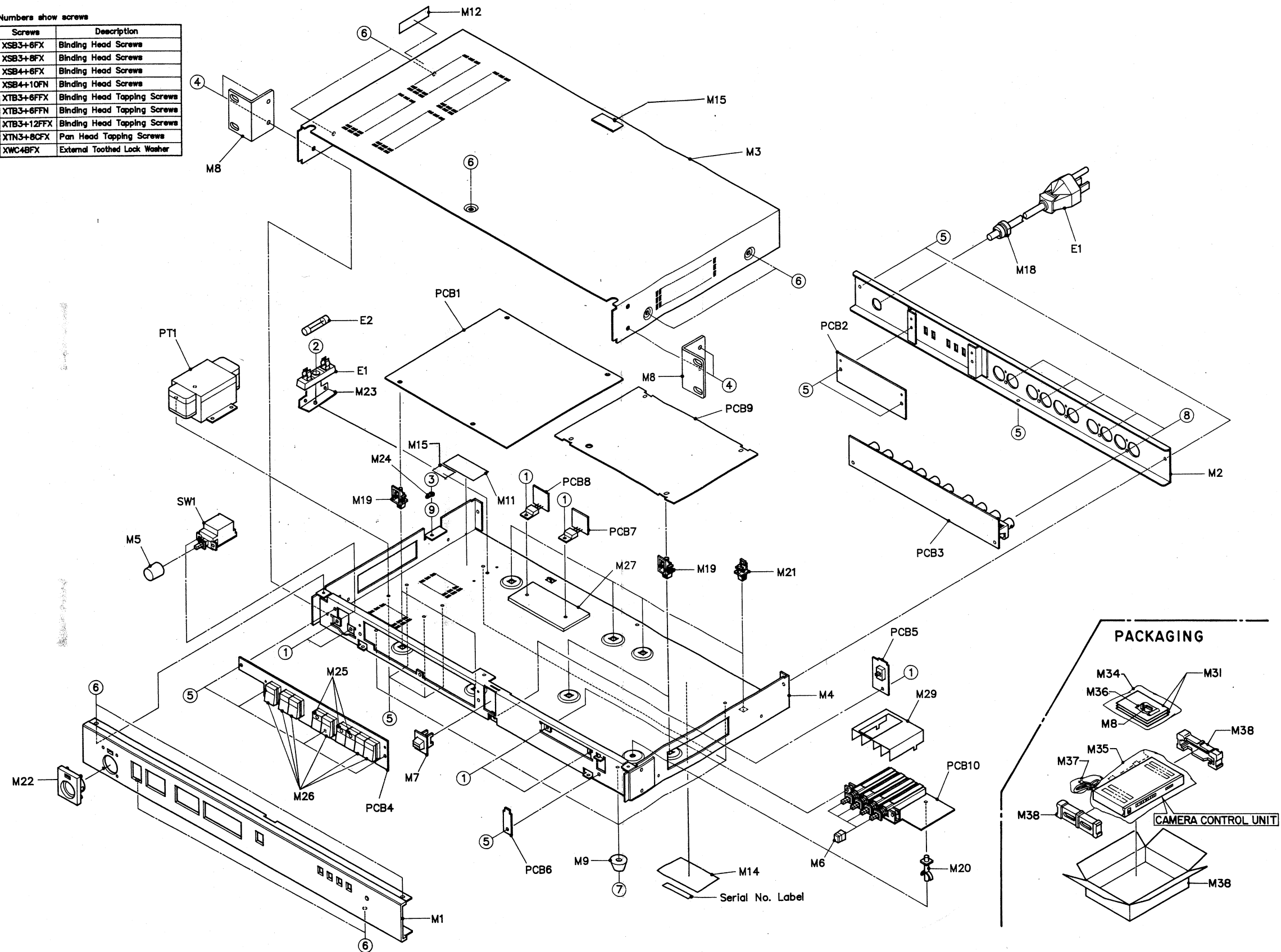


(B)

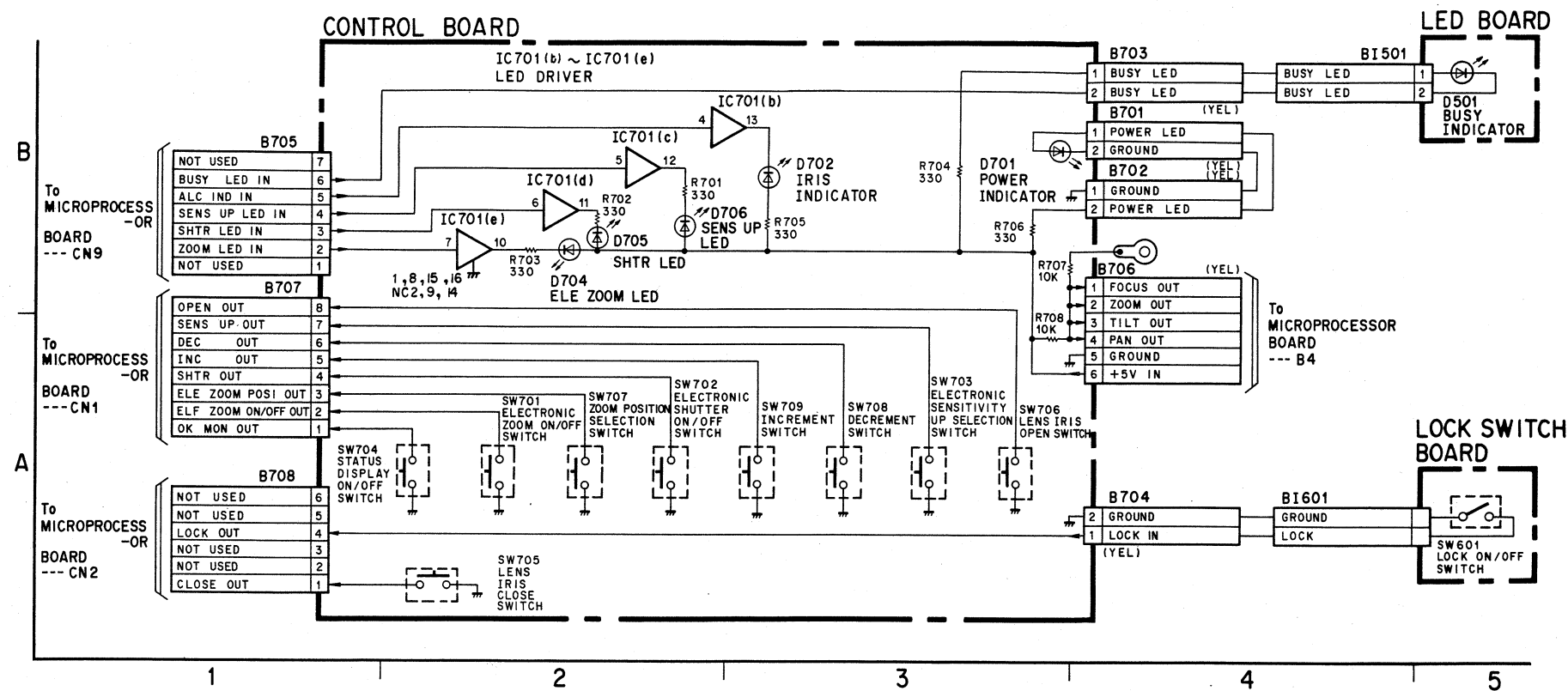
EXPLODED VIEW OF WV-CU204

○ Numbers show screws

No.	Screws	Description
①	XSB3+8FX	Binding Head Screws
②	XSB3+8FX	Binding Head Screws
③	XSB4+6FX	Binding Head Screws
④	XSB4+10FN	Binding Head Screws
⑤	XTB3+6FFX	Binding Head Tapping Screws
⑥	XTB3+6FFN	Binding Head Tapping Screws
⑦	XTB3+12FFX	Binding Head Tapping Screws
⑧	XTN3+8CFX	Pan Head Tapping Screws
⑨	XWC4BFX	External Toothed Lock Washer



SCHEMATIC DIAGRAM OF CONTROL BOARD, LED BOARD, LOCK SWITCH BOARD



<VOLTAGES>

Pin	IC1
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	3.6
11	3.5
12	3.6
13	3.7
14	3.6
15	0
16	0

<ADDRESS INFORMATION>

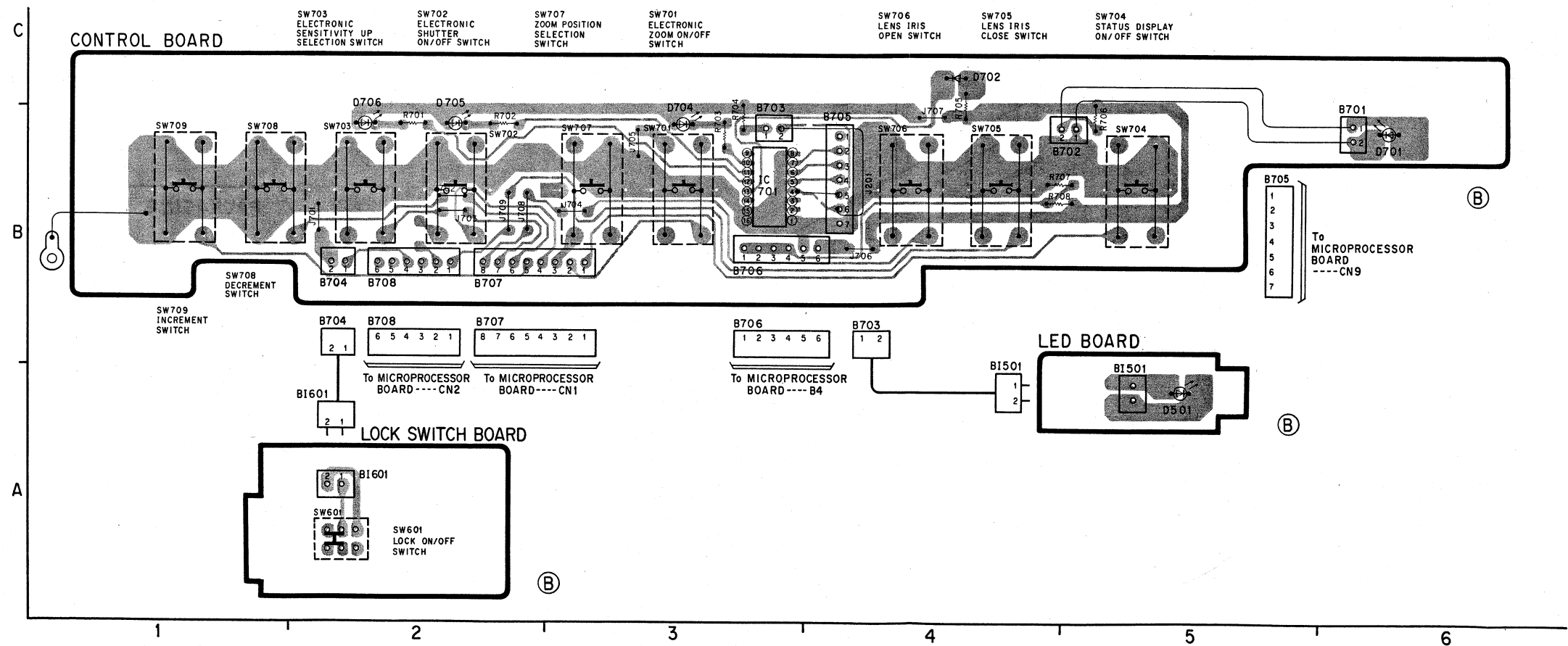
CONTROL BOARD

IC701	B2, B3
D701	B3
D702	B3
D704	B2
D705	B2
D706	B2

LED BOARD

D501	B5
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CONDUCTOR VIEW OF CONTROL BOARD, LED BOARD, LOCK SWITCH BOARD



<ADDRESS INFORMATION>

CONTROL BOARD

IC701	B3
D701	B6
D702	C4
D704	B3
D705	B2
D706	B2

LED BOARD

D501	A5
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REPLACEMENT PARTS LIST

Important Notice

- Components identified by "△" mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.
- Printed circuit board assembly with mark (NLA) is no longer available after production discontinuation of the complete set.

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
MISCELLANEOUS			INTERFACE BOARD		
PT1 △	YWI0137	Power Transformer	PCB1 (NLA)	YWVKB0204E1A	Printed Circuit Board Assy
SW1	YWESB99682V	Push Switch	IC201	MN4053BS	IC
F1 △	XBA2C01ET0A	Current Fuse 0.1A 250V	IC202	MN74HC08S	IC
E1 △	YFKPGTSA25	AC Power Cord for WV-CU204/A	Q101,102	2SC2404-CD	Transistor
	YFHB5308B	AC Power Cord for WV-CU204/B	Q103	2SD636-QRS	Transistor
			Q104	2SD601-RS	Transistor
	YFVM030908A	AC Power Cord for WV-CU204/G			
	YFCE030908FA	AC Power Cord for WV-CU204F	Q105	2SB709-RS	Transistor
E2	YWX-N1153-07	Fuse Holder	Q106	2SA1022-C	Transistor
M1	YWV5V/A1002A2	Front Panel	Q107	2SC2404-CD	Transistor
M2	YWV5WC1003A2	Rear Panel	Q108	2SD601-RS	Transistor
			Q109	2SC2404-CD	Transistor
M3	YWV5EA0759A2	Upper Cover			
M4	YWV2KA0544B1	Main Chassis	Q110	2SB709-RS	Transistor
M5	YWA5RC0141A3	Power Switch Knob	Q111	2SD636-QRS	Transistor
M6	YWA6JP0025A3	Push Button	Q112,113	2SD601-RS	Transistor
M7	YWV5RA0078A3	Slided Switch Knob	Q114	2SA1022-C	Transistor
			Q115-119	2SD601-RS	Transistor
M8	YWA2SB1036A4	Mounting Angle	Q120	2SB709-RS	Transistor
M9	YWV5350WB01	Rubber Foot (X4)	Q121,122	2SD601-RS	Transistor
M11	YFV7MA0120A4	Fuse Change Label	Q123	2SB709-RS	Transistor
M12	YFV7MB0099A4	UL Caution Label for WV-CU204/A,B,G	Q124,125	2SD601-RS	Transistor
	YFV7MB0106A4	UL Caution Label for WV-CU204F	Q126	UN2111	Transistor
M14 △	YWV7QA2111A4	Main Label for WV-CU204/A	Q127	UN2211	Transistor
	YWV7QA2112A4	Main Label for WV-CU204/B	Q128	2SB709-RS	Transistor
	YWV7QA2114A4	Main Label for WV-CU204/G	Q129	2SA1022-C	Transistor
	YWV7QA2115A4	Main Label for WV-CU204F	Q130	2SC2404-CD	Transistor
M15	YWV7MA0344A4	Fuse Rated Label	Q131-133	UN2211	Transistor
M18	YWSR6W1	Cord Clamp	Q201,202	2SD636-QRS	Transistor
M19	YWKGES8	Support A	Q203-205	2SD601-RS	Transistor
M20	YWKGLS8S	Support B	Q206	2SB709-RS	Transistor
M21	YWPHD08	Support C	Q207,208	2SD601-RS	Transistor
M22	YWA5CD0009C3	Card Holder	Q209	2SB709-RS	Transistor
M23	YFV2PA0190A4	Insulator Sheet	Q210-212	2SD601-RS	Transistor
M24	YW-BCG-EM01	Earth Lug	Q213	2SB709-RS	Transistor
M27	YWV7DA0261A4	Heat Sink	Q214-216	2SD601-RS	Transistor
			Q217,218	2SD636-QRS	Transistor
			Q219-224	2SD601-RS	Transistor
			Q225,226	2SB709-RS	Transistor
			Q227,228	2SD601-RS	Transistor
			Q229	2SB709-RS	Transistor
			Q230,231	2SD601-RS	Transistor
			Q232	2SB709-RS	Transistor
			Q233	2SD601-RS	Transistor
			Q234	2SA1022-C	Transistor
			Q235	2SC2404-CD	Transistor
			Q236	2SD601-RS	Transistor
			Q237,238	2SC2404-CD	Transistor

REF.NO.	PART NO.	DESCRIPTION		REF.NO.	PART NO.	DESCRIPTION	
Q239	2SD601-RS	Transistor		R144	ERJ8GEYJ131	Carbon	130 ohms 1/8W
D101	MA157TW	Diode		R145	ERJ8GCSG911	Carbon	910 ohms 1/8W
D102	MA151K	Diode		R146	ERJ8GCSG560	Carbon	56 ohms 1/8W
D103	MA151WK	Diode		R147	ERJ8GCSG101	Carbon	100 ohms 1/8W
D104	YWRD5.1JSB2	Diode		R148,149	ERJ8GCSJ102	Carbon	1K ohms 1/8W
D105	MA151K	Diode		R150	ERJ8GCSG122	Carbon	1.2K ohms 1/8W
D201,202	MA151A	Diode		R151	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
D203	MA151K	Diode		R152	ERJ8GCSJ223	Carbon	22K ohms 1/8W
D204	MA157TW	Diode		R153	ERJ8GCSJ471	Carbon	470 ohms 1/8W
D205	YWERA1501	Diode		R154	EROS2CKF2400	Metal	240 ohms
D206-209	SIB01-02	Diode		R155	ERJ8GCSG221	Carbon	220 ohms 1/8W
D210	YWERA1501	Diode		R156	ERJ8GCSG431	Carbon	430 ohms 1/8W
D211	MA151WK	Diode		R157	ERJ8GCSG302	Carbon	3K ohms 1/8W
D212,213	MA151K	Diode		R158	EROS2CKF1201	Metal	1.2K ohms
R101,102	ERJ8GCSJ331	Carbon	330 ohms 1/8W	R159	ERJ8GCSG123	Carbon	12K ohms 1/8W
R103	ERSB27J332	Metal	3.3K ohms	R160,161	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R104	ERJ8GCSG123	Carbon	12K ohms 1/8W	R162	ERJ8GCSG302	Carbon	3K ohms 1/8W
R105	ERJ8GCSJ102	Carbon	1K ohms 1/8W	R163	ERJ8GCSG391	Carbon	390 ohms 1/8W
R106	ERJ8GCSJ471	Carbon	470 ohms 1/8W	R164	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R107	ERJ8GCSG101	Carbon	100 ohms 1/8W	R165	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R108	ERJ8GCSJ331	Carbon	330 ohms 1/8W	R166	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R109	ERJ8GCSG123	Carbon	12K ohms 1/8W	R167	ERJ8GCSJ152	Carbon	1.5K ohms 1/8W
R110	ERJ8GCSJ103	Carbon	10K ohms 1/8W	R168	ERJ8GCSG101	Carbon	100 ohms 1/8W
R111	ERJ8GCSJ102	Carbon	1K ohms 1/8W	R169	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R112	ERJ8GCSG560	Carbon	56 ohms 1/8W	R171	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R113	ERDS2TJ121	Carbon	120 ohms 1/4W	R172	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R114	ERDS2TJ680	Carbon	68 ohms 1/4W	R173,174	ERJ8GCSG560	Carbon	56 ohms 1/8W
R115	ERJ8GCSJ103	Carbon	10K ohms 1/8W	R175,176	ERJ8GCSG272	Carbon	2.7K ohms 1/8W
R116	ERJ8GCSG560	Carbon	56 ohms 1/8W	R177	ERJ8GCSG560	Carbon	56 ohms 1/8W
R117	ERJ8GCSJ102	Carbon	1K ohms 1/8W	R178	ERJ8GCSG272	Carbon	2.7K ohms 1/8W
R118	ERJ8GCSG560	Carbon	56 ohms 1/8W	R179,180	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R119	ERJ8GCSG272	Carbon	2.7K ohms 1/8W	R181	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R120	ERJ8GCSJ751	Carbon	750 ohms 1/8W	R182	ERJ8GCSJ751	Carbon	750 ohms 1/8W
R121,122	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W	R183	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R123	ERJ8GCSG560	Carbon	56 ohms 1/8W	R184,186	ERDS2TJ560	Carbon	56 ohms 1/4W
R124	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W	R201	ERJ8GCSJ100	Carbon	10 ohms 1/8W
R125	ERJ8GCSG272	Carbon	2.7K ohms 1/8W	R202	ERDS2TJ620	Carbon	62 ohms 1/4W
R126	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W	R203	ERDS2TJ560	Carbon	56 ohms 1/4W
R127	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W	R204	ERJ8GCSG821	Carbon	820 ohms 1/8W
R128	ERDS2TJ121	Carbon	120 ohms 1/4W	R205	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R129	ERDS2TJ680	Carbon	68 ohms 1/4W	R206	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R130	ERJ8GCSJ103	Carbon	10K ohms 1/8W	R207	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R131	ERJ8GCSG560	Carbon	56 ohms 1/8W	R208	ERJ8GCSG162	Carbon	1.6K ohms 1/8W
R132	ERJ8GCSJ103	Carbon	10K ohms 1/8W	R209	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R133	ERJ8GCSG123	Carbon	12K ohms 1/8W	R210	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R134	ERJ8GCSG272	Carbon	2.7K ohms 1/8W	R211	EROS2CKF2201	Metal	2.2K ohms
R135	ERJ8GCSJ223	Carbon	22K ohms 1/8W	R212	EROS2CKF2200	Metal	220 ohms
R136	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W	R213	EROS2CKF7501	Metal	7.5 ohms
R137	ERJ8GCSJ102	Carbon	1K ohms 1/8W	R214	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R138	ERJ8GCSJ561	Carbon	560 ohms 1/8W	R215	ERJ8GCSG391	Carbon	390 ohms 1/8W
R139	ERJ8GCSG302	Carbon	3K ohms 1/8W	R216	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R140	ERJ8GCSG101	Carbon	100 ohms 1/8W	R217	ERJ8GCSG123	Carbon	12K ohms 1/8W
R141	ERJ8GCSG911	Carbon	910 ohms 1/8W	R218	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R142	ERJ8GCSJ182	Carbon	1.8K ohms 1/8W	R219	ERJ8GCSG123	Carbon	12K ohms 1/8W
R143	ERJ8GCSJ751	Carbon	750 ohms 1/8W				

REF.NO.	PART NO.	DESCRIPTION		REF.NO.	PART NO.	DESCRIPTION	
R220	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W	R284	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R221,222	ERJ8GCSG333	Carbon	33K ohms 1/8W	R285	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R223	ERJ8GCSJ561	Carbon	560 ohms 1/8W	R286	ERJ8GCSG681	Carbon	680 ohms 1/8W
R224	ERJ8GCSG391	Carbon	390 ohms 1/8W	R287	ERJ8GCSJ471	Carbon	470 ohms 1/8W
R225	ERJ8GCSJ103	Carbon	10K ohms 1/8W	R288	ERJ8GCSG101	Carbon	100 ohms 1/8W
R226	ERJ8GCSG123	Carbon	12K ohms 1/8W	R289	oERSB27J332	Metal	3.3K ohms
R227	ERJ8GCSJ103	Carbon	10K ohms 1/8W	R290	ERJ8GCSG123	Carbon	12K ohms 1/8W
R228	ERJ8GCSG123	Carbon	12K ohms 1/8W	R291,292	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R229	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W	R293	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R231	EROS2CKF9100	Metal	910 ohms	R294	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R232	ERJ8GCSG221	Carbon	220 ohms 1/8W	R295	ERJ8GCSG221	Carbon	220 ohms 1/8W
R233	ERJ8GCSJ471	Carbon	470 ohms 1/8W	R296,297	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R234	EROS2CKF1501	Metal	1.5K ohms	R298	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R235	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W	R299	ERJ8GCSJ471	Carbon	470 ohms 1/8W
R236	ERJ8GCSJ102	Carbon	1K ohms 1/8W	R303	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R237	ERDS2TJ560	Carbon	56 ohms 1/4W	R304	ERJ8GCSG101	Carbon	100 ohms 1/8W
R238	ERJ8GCSJ103	Carbon	10K ohms 1/8W	R305	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R239	ERDS2TJ620	Carbon	62 ohms 1/4W	R306	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R240	ERJ8GCSJ103	Carbon	10K ohms 1/8W	R307	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R241	ERJ8GCSJ100	Carbon	10 ohms 1/8W	VR201,202	YVH0621A1K	Variable Resistor 1K ohms	
R242,243	ERJ8GCSJ102	Carbon	1K ohms 1/8W	C101	ECEA1CU470	Electrolytic	47 μ F 16V
R244	ERJ8GCSG302	Carbon	3K ohms 1/8W	C102	YF426102CHJS	Ceramic	1000 pF 50V
R245	ERJ8GCSG153	Carbon	15K ohms 1/8W	C103,104	YF426223XKS	Ceramic	0.022 μ F 50V
R246	ERJ8GCSJ471	Carbon	470 ohms 1/8W	C105	YF426102CHJS	Ceramic	1000 pF 50V
R247	EROS2CKF1800	Metal	180 ohms	C106	YF426223XKS	Ceramic	0.022 μ F 50V
R248	ERJ8GCSG681	Carbon	680 ohms 1/8W	C107	YF426330CHJS	Ceramic	33 pF 50V
R249	ERJ8GCSG431	Carbon	430 ohms 1/8W	C108	ECEA1CU471	Electrolytic	470 μ F 16V
R250	EROS2CKF1301	Metal		C109	ECEA1CU470	Electrolytic	47 μ F 16V
R251	ERJ8GCSG302	Carbon	3K ohms 1/8W	C110,111	YF426330CHJS	Ceramic	33 pF 50V
R252	ERJ8GCSG153	Carbon	15K ohms 1/8W	C112	YF426220CHKS	Ceramic	22 pF
R253	ERJ8GCSJ102	Carbon	1K ohms 1/8W	C113	YF426101CHJS	Ceramic	100 pF 50V
R255	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W	C114	ECEA1CU471	Electrolytic	470 μ F 16V
R256	ERJ8GCSJ102	Carbon	1K ohms 1/8W	C115-117	ECEA1CU470	Electrolytic	47 μ F 16V
R257	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W	C118	YF426121CHJS	Ceramic	120 pF 50V
R258	ERJ8GCSJ102	Carbon	1K ohms 1/8W	C119	YF426151CHJS	Ceramic	150 pF 50V
R259	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W	C120	YF426221SLKS	Ceramic	220 pF 50V
R260,261	ERJ8GCSJ103	Carbon	10K ohms 1/8W	C121	YF426331CHJS	Ceramic	330 pF 50V
R262	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W	C122	YF426121CHJS	Ceramic	120 pF 50V
R263	ERJ8GCSG272	Carbon	2.7K ohms 1/8W	C123	YF426330CHJS	Ceramic	33 pF 50V
R264	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W	C124,125	ECEA1CU470	Electrolytic	47 μ F 16V
R265	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W	C126	YF426220CHKS	Ceramic	22 pF
R267-269	ERJ8GCSJ102	Carbon	1K ohms 1/8W	C127	ECEA0JU470	Electrolytic	47 μ F 6.3V
R270	ERJ8GCSG560	Carbon	56 ohms 1/8W	C128	YF426101CHJS	Ceramic	100 pF 50V
R272	ERJ8GCSJ331	Carbon	330 ohms 1/8W	C129	ECEA1HU2R2	Electrolytic	2.2 μ F 50V
R273	ERJ8GCSG101	Carbon	100 ohms 1/8W	C130	YF426473XMS	Ceramic	0.047 μ F
R274	ERJ8GCSG221	Carbon	220 ohms 1/8W	C131	ECEA1CU470	Electrolytic	47 μ F 16V
R275	ERJ8GCSJ102	Carbon	1K ohms 1/8W	C132	ECEA1CN100S	Electrolytic	10 μ F 16V
R276	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W	C133	YF426131CHJS	Ceramic	130 pF
R277	ERJ8GCSJ223	Carbon	22K ohms 1/8W	C134	YF426220CHKS	Ceramic	22 pF
R278	ERJ8GCSG272	Carbon	2.7K ohms 1/8W	C135	ECEA1CU470	Electrolytic	47 μ F 16V
R279	ERJ8GCSJ103	Carbon	10K ohms 1/8W	C201	ECEA1CU471	Electrolytic	470 μ F 16V
R280	ERJ8GCSG123	Carbon	12K ohms 1/8W	C202	ECEA1CU100	Electrolytic	10 μ F 16V
R281	ERJ8GCSG560	Carbon	56 ohms 1/8W	C203	ECEA1CU470	Electrolytic	47 μ F 16V
R282	ERJ8GCSJ102	Carbon	1K ohms 1/8W	C204,205	ECEA0JU470	Electrolytic	47 μ F 6.3V
R283	ERJ8GCSG183	Carbon	18K ohms 1/8W	C206	YF426471SLFS	Ceramic	470 pF

REF.NO.	PART NO.	DESCRIPTION		REF.NO.	PART NO.	DESCRIPTION	
C207	ECEA0JU470	Electrolytic	47 μ F 6.3V	SWITCH BOARD			
C208	YF426471SLFS	Ceramic	470 pF	PCB2 R401,402 SW401-405 SW406	YWVRAU204P1B ERDS2TJ103 YWSSSF0136L YWSSSF0126L	Printed Board Carbon 10K ohms 1/4W Slide Switch Slide Switch	
C209	YF426100CHDS	Ceramic	10 pF 50V				
C210	ECEA1CU470	Electrolytic	47 μ F 16V				
C211	ECEA1CU100	Electrolytic	10 μ F 16V				
C212	ECEA1CU471	Electrolytic	470 μ F 16V				
C213,214	ECEA1CU470	Electrolytic	47 μ F 16V	CONNECTOR BOARD			
C215	YF426470SLKS	Ceramic	47 pF 50V	PCB3 R501-504 EU501,502 EU503	YWVRAU204P1B ERDS2TJ750 YWP2203 YWP2206	Printed Board Carbon 75 ohms 1/4W BNC4-pin Connector BNC 2-pin Connector	
C216	ECEA0JU470	Electrolytic	47 μ F 6.3V				
C217	ECEA1CN100S	Electrolytic	10 μ F 16V				
C218	YF426131CHJS	Ceramic	130 pF				
C219	YF426220CHKS	Ceramic	22 pF				
C220	ECEA1CU471	Electrolytic	470 μ F 16V	CONTROL BOARD			
C221	YF426131CHJS	Ceramic	130 pF	PCB4 (NLA) IC701 D701 D702 D704-706	YWVKEU204E1A AN90B21S LN242RP LN48YP SLH38MC	Printed Circuit Board Assy IC LED LED LED	
C222	ECEA1CN100S	Electrolytic	10 μ F 16V				
C223	YF426240CHJS	Ceramic	24 pF 50V				
C224	YF426330CHJS	Ceramic	33 pF 50V				
C226-228	ECEA1CU470	Electrolytic	47 μ F 16V				
C229	YF426223XKS	Ceramic	0.022 μ F 50V	R701-706 R707,708 SW701-709 J201 J701-707	ERJ8GCSJ331 ERJ8GCSJ103 YWAB12HA130 ERDS2TC0 ERJ8GCS0R00	Carbon 330 ohms 1/8W Carbon 10K ohms 1/8W Push Switch Jumper Resistor Jumper Resistor	
C230	YF426102CHJS	Ceramic	1000 pF 50V				
C231,232	YF426223XKS	Ceramic	0.022 μ F 50V				
C233	YF426102CHJS	Ceramic	1000 pF 50V				
C234	ECEA1CU470	Electrolytic	47 μ F 16V				
C235	ECEA1EU102	Electrolytic	1000 μ F 25V	M25 M26	YWV6JA0074A3 YWV6JA0075A3	Button A Button B	
C237	ECEA1CU100	Electrolytic	10 μ F 16V				
C238	ECEA1CS102	Electrolytic	1000 μ F 16V				
C242	ECEA0JU102	Electrolytic	1000 μ F 6.3V				
C254	ECEA1CU470	Electrolytic	47 μ F 16V				
C255	ECEA1CU470	Electrolytic	47 μ F 16V	LOCK SWITCH BOARD			
C258	YF426150CHJS	Ceramic	15 pF	PCB5 SW601	YWVRAU204P1B YWSSS322	Printed Board Slide Switch	
C259	YF426100CHDS	Ceramic	10 pF				
C260,261	YF426330CHJS	Ceramic	33 pF	LED BOARD			
C262	YF426750CHJS	Ceramic	75 pF	PCB6 D501	YWVRAU204P1B LN29RD	Printed Board LED	
C263	YF426150CHJS	Ceramic	15 pF 50V				
C264	ECEA1CU101	Electrolytic	100 μ F 16V	REGULATOR BOARD-1			
C265	ECQM1H473JZ	Plastic	0.047 μ F 50V	PCB7 (NLA) IC203 C236,237	YWVKHU204E1B YWNJM78M12FA ECQV1H104JZ	Printed Circuit Board Assy IC Plastic 0.1 μ F 50V	
C266	ECQB1H682JZ	Plastic	6800 pF				
L101,102	EL05SI100K	Coil	10 μ H				
L201,202	EL05SI100K	Coil	10 μ H				
L203	EL05SI8R2K	Coil	8.2 μ H	REGULATOR BOARD-2			
L204	EL05SI100K	Coil	10 μ H	PCB8 (NLA) IC204 C240,241	YWVKIU204E1A YWNJM78M05FA ECQV1H104JZ	Printed Circuit Board Assy IC Plastic 0.1 μ F 50V	
CF101,102	YWE112S	Ceramic Filter					
CF103,201	ELB4M081	Filter					
CF202,203	YWE117S	Ceramic Filter					
CF204	ELB5B031	Ceramic Filter					
RL201	AG4019	Relay					
RL202	AG4013	Relay					
CN203	YFB04DR	Connector					
J1-22	ERJ8GCS0R00	Jumper Resistor					
J202	ERDS2TC0	Jumper Resistor					
CN1	YWB3BXHA	3-pin Connector					
CN2	YFB4B-XH-A	4-pin Connector					

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
MICROPROCESSOR BOARD			SELECTOR BOARD		
PCB9 (NLA)	YWVKBU204E2A	Printed Circuit Board Assy	PCB10 (NLA)	YWVKCU204E2A	Printed Circuit Board Assy
IC1	YWM50455001S	IC	Q302,303	2SD601-QR	Transistor
IC2	YWCF37801PG	IC	Q304	2SB709-QR	Transistor
IC3	-D75116F592	LSI	Q305	2SD601-QR	Transistor
IC4-6	AN90B20	IC	Q306	2SB709-QR	Transistor
IC7	M51951ASL	IC	D301-308	MA151K	Diode
IC8,9	MN74HC02S	IC	R302-305	YF2116103JT	Carbon 10K ohms 1/16W
IC10	YWTC7S08F	IC	R306	YF2116561JT	Carbon 560 ohms 1/16W
IC11-13	YWTC4S69F	IC	R307	YF2116222GT	Carbon 2.2K ohms 1/16W
IC14-19	MN74HC02S	IC	R308	YF2116472GT	Carbon 4.7K ohms 1/16W
IC20	MN74HC27S	IC	R309	YF2116682JT	Carbon 6.8K ohms 1/16W
IC21	MN74HC74S	IC	R310	YF2116102GT	Carbon 1K ohms 1/16W
IC22,23	YWTC7504F	IC	R311-315	YF2116103JT	Carbon 10K ohms 1/16W
IC24	YWTC7502F	IC	R316	YF2116223JT	Carbon 22K ohms 1/16W
IC25,26	YWTC7508F	IC	R317	YF2116103JT	Carbon 10K ohms 1/16W
Q1	2SB709-RS	Transistor	R318	YF2116301JT	Carbon 300 ohms 1/16W
Q2	UN2211	Transistor	R319	YF2116472GT	Carbon 4.7K ohms 1/16W
D1	MA151WK	Diode	C305	ECEA1AU470	Electrolytic 47 μ F 10V
R1	YF2116472GT	Carbon 4.7K ohms 1/16W	C306	YF400103XKT	Ceramic 0.01 μ F
R2	YF2116103JT	Carbon 10K ohms 1/16W	C307	YF400104FZT	Ceramic 0.1 μ F
R3	2116101JT	Carbon 100 ohms	SW301	PSC040AF6IP	Push Switch
R15-22	YF2116333GT	Carbon 33K ohms 1/16W	CN301,302	YFB9B-XH-A	9-pin Connector
R23	YW2116105JT	Carbon 1M ohms 1/16W	CN303	YFB05DR	5-pin Connector
R24,25	YF2116333GT	Carbon 33K ohms 1/16W	CN304	YFB4B-XH-A	4-pin Connector
R26-48	YF2116103JT	Carbon 10K ohms 1/16W	CN305	YFB04DR	4-pin Connector
R49,50	YF2116102GT	Carbon 1K ohms 1/16W	M29	YWV2HA0827A3	Shield Cover
R51	YF2116202JT	Carbon 2K ohms 1/16W	ACCESSORY PARTS/PACKAGING PARTS		
R52	YF2116103JT	Carbon 10K ohms 1/16W	M8	YWA2SB1036A4	Mounting Angle
R60,61	YF2116222GT	Carbon 2.2K ohms 1/16W	M31	YWV8QA2024AN	Operating Instructions
R62	YF2116223JT	Carbon 22K ohms 1/16W	M34	XZB26X40C05	Polyethylene Bag for Printed
R63	YF2116103JT	Carbon 10K ohms 1/16W	M35	XZB55X50C1	Polyethylene Bag for Camera Control Unit
C1	YF400270CHJT	Ceramic 27 pF	M36	YWT10X16C03	Polyethylene Bag for Mounting Angle
C2,3	ECEA0JU470	Electrolytic 47 μ F 6.3V	M37	YWT20X35C03	Polyethylene Bag for Power Cord
C4	ECEA0JU332	Electrolytic 3300 μ F 6.3V	M38	YWV9CA1399AN	Packaging Assy for WV-CU204/ABG
C5-7	YF400104FZT	Ceramic 0.1 μ F		YWV9CA1400AN	Packaging Assy for WV-CU204F
C8	ECEA0JS101	Electrolytic 100 μ F 6.3V			
C9-18	YF400104FZT	Ceramic 0.1 μ F			
C19-22	YF400101CHJT	Ceramic 100 pF			
C23	YF400120CHJT	Ceramic 12 pF CH			
C24	YW400183FZT	Ceramic 0.018 μ F			
C25	YF400273FZT	Ceramic 0.027 μ F			
C26	YF400150CHJT	Ceramic 15 pF			
C27	ECQB1H103JZ	Plastic 0.01 μ F 50V			
C28	YF400122XKT	Ceramic 1200 pF			
C30	ECEA0JU332	Electrolytic 3300 μ F 6.3V			
CT1	YFT203R300FR	Trimmer Capacitor 30 pF			
L1	EL05S1150J	Coil 15 μ H			
L2	EL05S1220K	Coil 22 μ H			
X1	YFEF0-FC4004	Crystal Oscillator			
X2	-HC49UA1773	Crystal Oscillator			

V00822

ORDER NO. AVS9011394S8

Service Manual

Camera Control Unit
WV-CU204

Supplement-1

Please use this supplement service manual together with original service manual for
Model No. WV-CU204 Order No. AVS8911267C8

LIST OF MODIFICATION

■ INTERFACE BOARD

- Pattern foil of Interface board has been changed to improve the productivity effected from serial number 09J01831 and higher.
- Due to change the pattern foil of Interface board, capacitors C137 and C138 have been changed from lead type to chip type.
- Due to change the pattern foil of interface board, jumper resistors J1 and J202 have been deleted.

■ MICROPROCESSOR BOARD

- Pattern foil of Microprocessor board has been changed to improve the productivity effected from serial number 09J01831 and higher.
- Replacement parts list of Microprocessor board has been corrected.

Panasonic

REPLACEMENT PARTS LIST MODIFICATION

Important Notice

- 1 Components identified by " ⚠ " mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.
- 2 Printed circuit board assembly with mark (NLA) is no longer available after production discontinuation of the complete set.

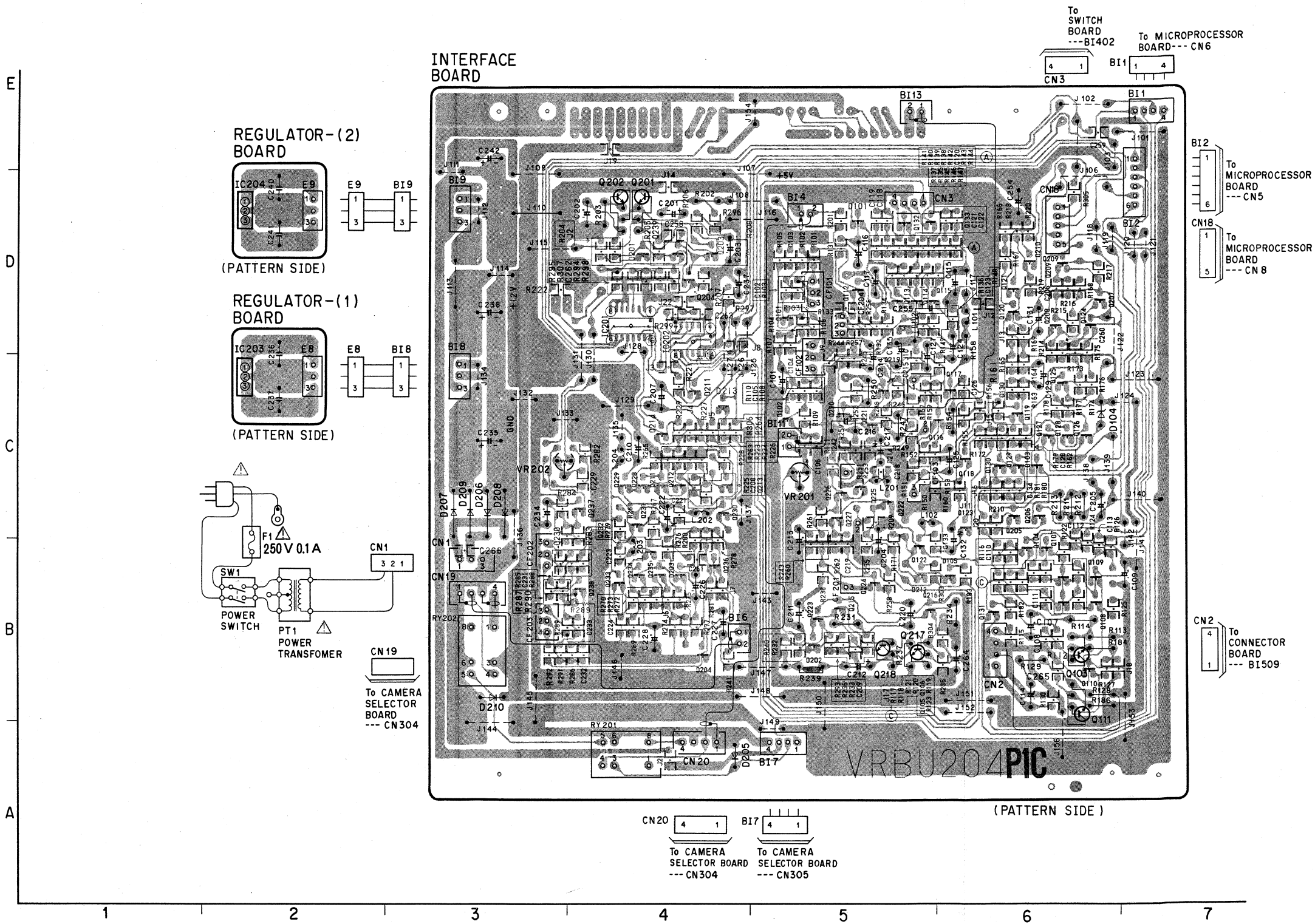
REFERENCE NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION
INTERFACE BOARD			
C265 C266 J1 J202	ECQM1H473JZ ECQM1H682JZ ERJ8GCS0R00 ERDS2TC0	YF426473XKT YF426682XKT _____ _____	Ceramic Ceramic Deletion Deletion 0.047 μ F 6800 pF
MICROPROCESSOR BOARD			
IC1 IC2 IC3 IC11-13 IC20 IC21 IC23 Q3 D1 R4 R52 R64 R65, 66 C1 C4 C27 X2 J5, 6 J100	YWM50455001S YWCF37801PG D75116F592 YWTC4S69F MN74HC27S MN74HC74S YWTC7S04F _____ MA151WK _____ YF2116103JT _____ _____ YF400270CHJT ECEA0JU332 ECQB1H103JZ HC49UA1773 _____ _____	YWM50554001S YWCF37808PG YWD75116F592 YWTC4SU69F _____ _____ 2SD601-RS _____ YF2116681JT _____ YF2116223JT YF2116472GT YF400120CHJT _____ _____ YF400103FZT YWKD7775FFA YF21160R00T ERDS2TC0	IC LSI IC IC Deletion Deletion Deletion Transistor Deletion Carbon 680 ohms 1/16W Deletion Carbon 22 kohms Carbon 4.7 kohms Ceramic 12 pF Deletion Ceramic Crystal Oscillator Jumper Resistor Jumper Resistor 0.01 μ F

CONDUCTOR VIEW OF INTERFACE BOARD

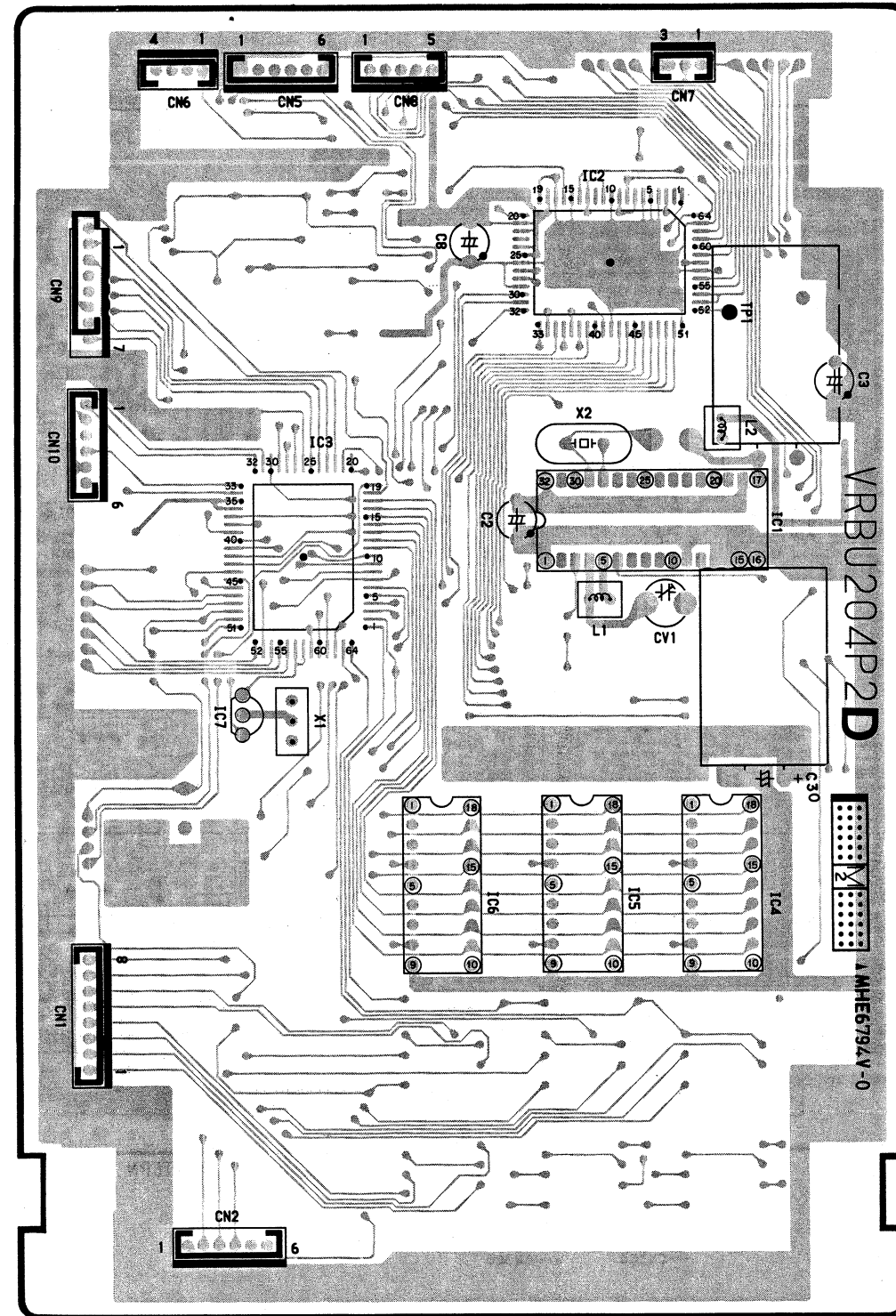
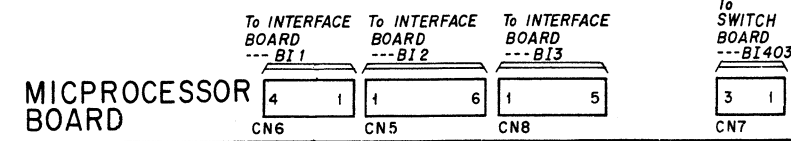
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INTERFACE BOARD

IC201	D4	Q229	C4
IC202	D4	Q230	C4
Q101	D5	Q231	C4
Q102	C5	Q232	B4
Q103	B6	Q233	B4
Q104	B6	Q234	B4
Q105	B6	Q235	B4
Q106	B6	Q236	B4
Q107	B6	Q237	C4
Q108	B6	Q238	B4
Q109	B6	Q239	D4
Q110	B6		
Q111	B6		
Q112	D5	D101	D5
Q113	D5	D102	D5
Q114	D5	D103	C6
Q115	D5	D104	C6
Q116	C5	D105	B6
Q117	C6	D201	D4
Q118	C6	D202	B5
Q119	C6	D203	B4
Q120	D6	D204	B4
Q121	D6	D205	A4
Q122	B5	D206	C3
Q123	C6	D207	C3
Q124	D6	D208	C3
Q125	C6	D209	C3
Q126	C6	D210	B3
Q127	C6	D211	C4
Q128	C6	D212	B5
Q129	C6	D213	C4
Q130	C6		
Q131	B6		
Q132	D5		
Q133	D5		
Q201	D4		
Q202	D4		
Q203	D4		
Q204	D4		
Q205	C6		
Q206	C6		
Q207	D6		
Q208	D6		
Q209	D6		
Q210	D6		
Q211	C4		
Q212	C4		
Q213	C4		
Q214	C4		
Q215	B5		
Q216	B5		
Q217	B5		
Q218	B5		
Q219	C5		
Q220	C5		
Q221	C5		
Q222	C5		
Q223	B5		
Q224	B5		
Q225	C5		
Q226	C5		
Q227	C5		
Q228	C4		

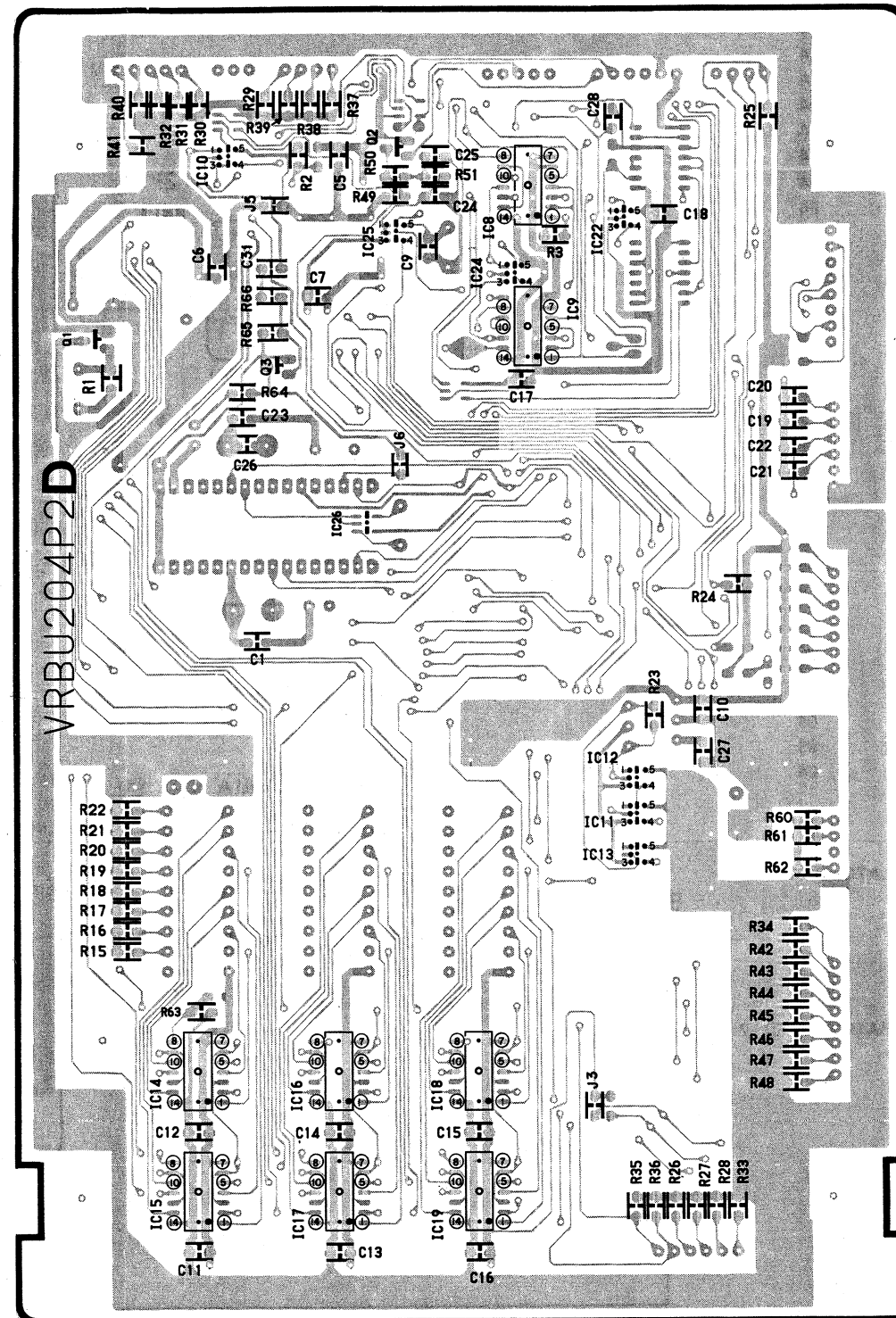


CONDUCTOR VIEW OF MICROPROCESSOR BOARD



(COMPONENT SIDE)

MICROPROCESSOR BOARD



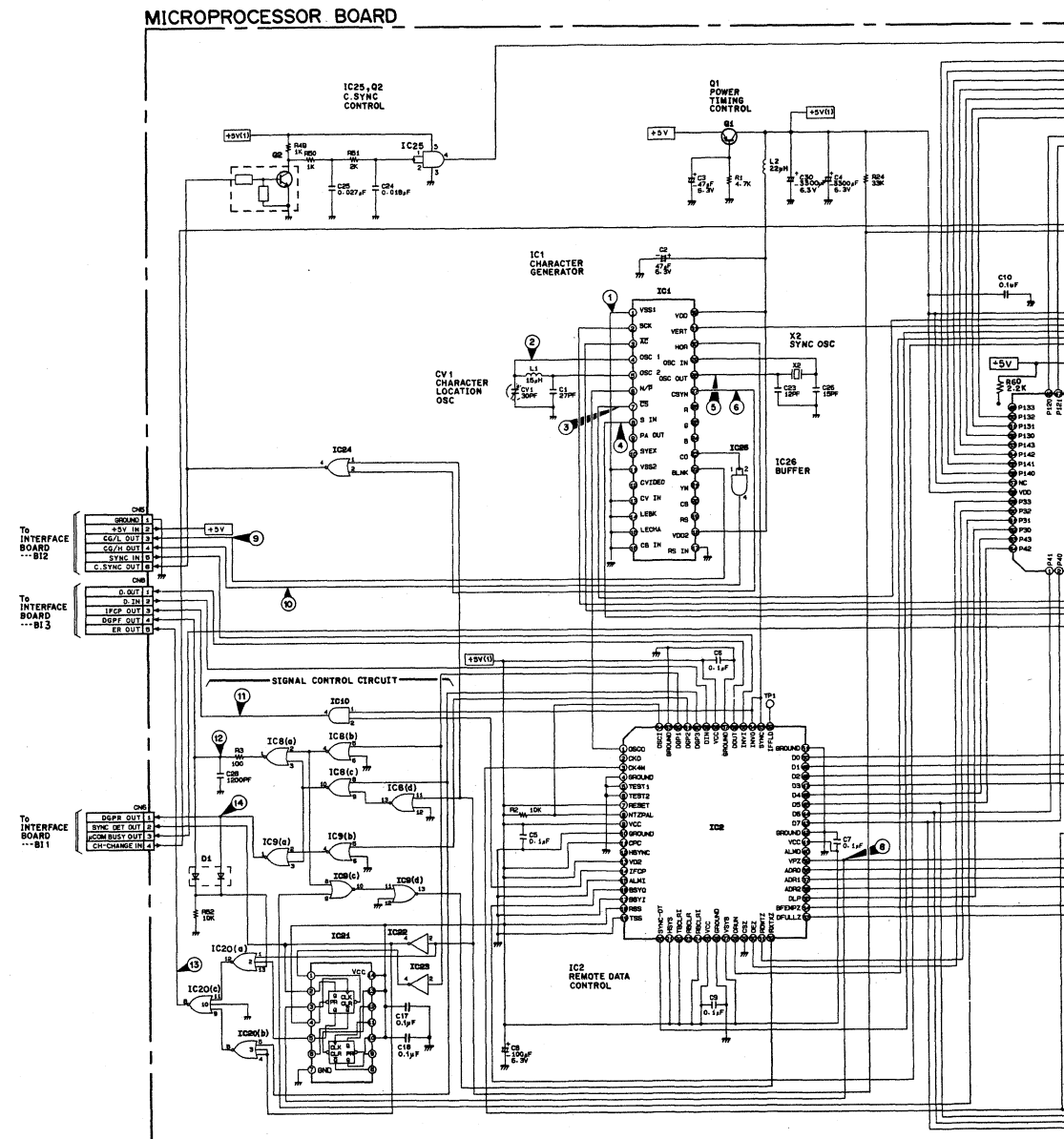
(PATTERN SIDE)

<ADDRESS INFORMATION>

MICROPROCESSOR BOARD

IC1	C3
IC2	C2
IC3	C2
IC4	B3
IC5	B2
IC6	B2
IC7	B2
IC8	D5
IC9	C5
IC10	D4
IC11	B5
IC12	B5
IC13	B5
IC14	A4
IC15	A4
IC16	A4
IC17	A4
IC18	A5
IC19	A5
IC20	D5
IC21	C5
IC22	C5
IC23	C5
IC24	C5
IC25	C4
IC26	C4
Q1	C4
Q2	D4
D1	C5

SCHEMATIC DIAGRAM OF MICROPROCESSOR BOARD



■ MICROPROCESSOR BOARD

- Q3, R64, R65, R66 and C31 have been changed.
- IC20, IC21, IC23, D1 and R52 have been deleted.
- Connection of +5V power line for IC1, IC2 and the other devices have been changed.

MICROPROCESSOR BOARD

